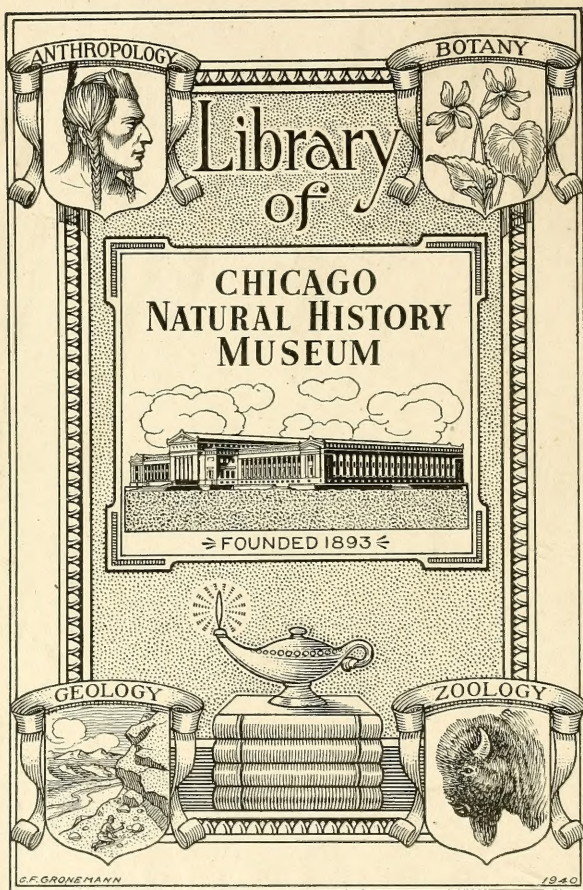






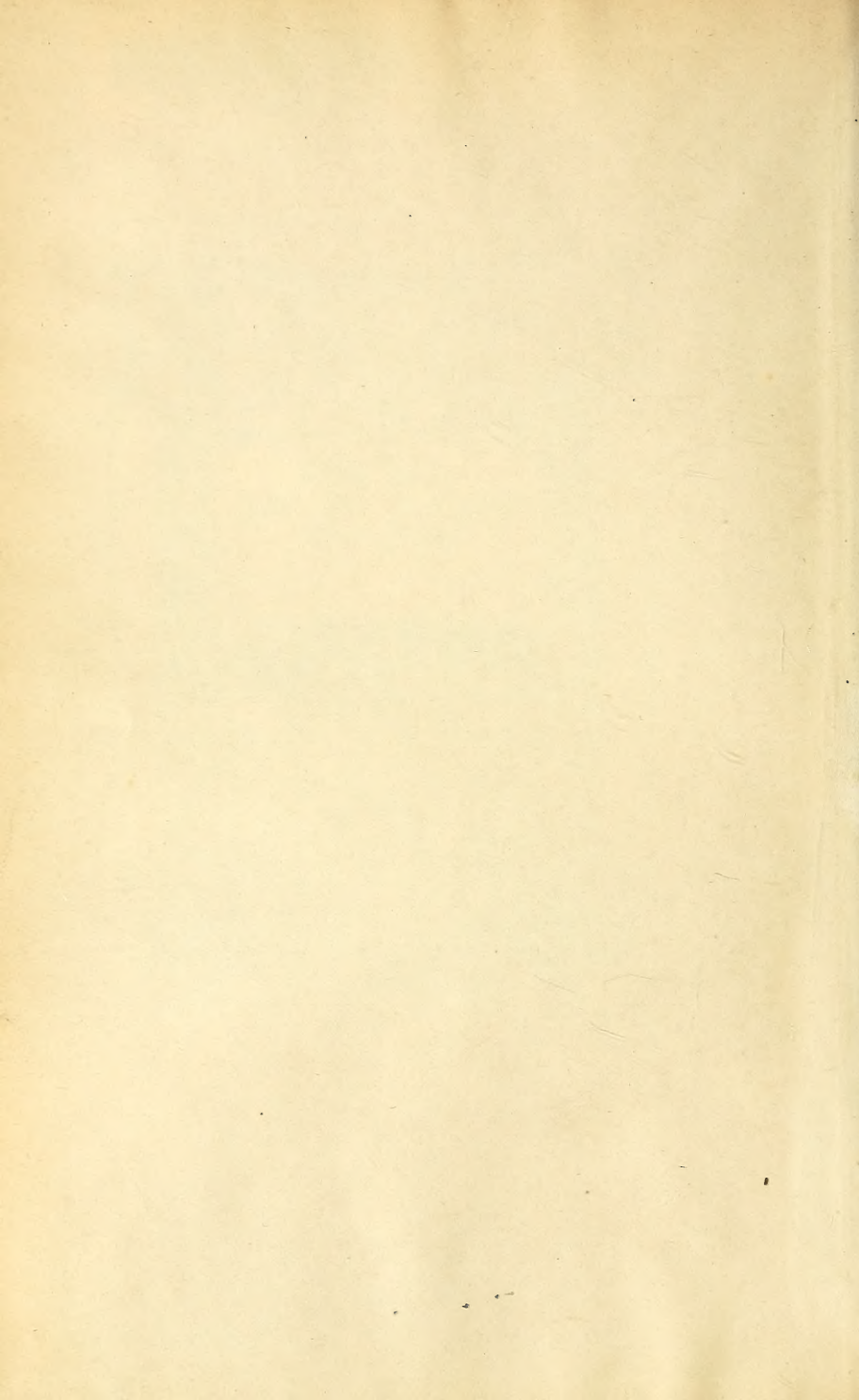


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1895

# THE SOUTH LONDON Entomological & Natural History Society,

(ESTABLISHED 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

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## OFFICERS & COUNCIL.

*Elected January 23rd, 1896.*

### President.

RICHARD SOUTH, F.E.S.

### Vice-Presidents.

C. G. BARRETT, F.E.S.      THOS. W. HALL, F.E.S.

### Council.

C. A. BRIGGS, F.E.S.	JOHN T. CARRINGTON.	W. A. PEARCE.
J. H. CARPENTER.	F. W. FROHAWK, F.E.S.	H. A. SAUZÉ.
W. MANSBRIDGE, F.E.S.		

### Hon. Curator.

W. WEST (Greenwich).

### Hon. Librarian.

HY. J. TURNER, F.E.S.

### Hon. Treasurer.

R. ADKIN, F.E.S., Wellfield, 4, Lingards Road, Lewisham, S.E.

### Hon. Secretaries.

S. EDWARDS, F.L.S., F.Z.S., F.E.S., etc. (*General Sec.*),  
Kidbrook Lodge, Blackheath, S.E.

H. J. TURNER, F.E.S. (*Report Sec.*),

13, Drakefell Road, St. Catherine's Park, S.E.

1895

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# THE SOUTH LONDON Entomological and Natural History Society,

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

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The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invite the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting their Specimens.

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## SUBSCRIPTION.

*Seven Shillings and Sixpence per Annum, with an Entrance  
Fee of Two Shillings and Sixpence.*

All Communications to be addressed to the Hon. Gen. Secretary,

S. EDWARDS, F.L.S., F.E.S., etc.

Kidbrook Lodge, Blackheath, S.E.

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## PAST PRESIDENTS.

1872 ... J. R. WELLMAN.	1884 ... W. WEST, L.D.S.
1873 ... „	1885 ... R. SOUTH, F.E.S.
1874 ... „	1886 ... R. ADKIN, F.E.S.
1875 ... A. B. FARN.	1887 ... „
1876 ... „	1888 ... T. R. BILLUPS, F.E.S.
1877 ... J. P. BARRETT.	1889 ... „
1878 ... J. T. WILLIAMS.	1890 ... J. T. CARRINGTON, F.L.S.
1879 ... R. STANDEN, F.E.S.	1891 ... W. H. TUGWELL, Ph.C.
1880 ... A. FICKLIN.	1892 ... C. G. BARRETT, F.E.S.
1881 ... V. R. PERKINS, F.E.S.	1893 ... J. J. WEIR, F.L.S., etc.
1882 ... T. R. BILLUPS, F.E.S.	1894 ... E. STEP.
1883 ... J. R. WELLMAN.	1895 ... T. W. HALL, F.E.S.



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REPORT OF THE COUNCIL, 1895.

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THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-Third Annual Report, notes with great pleasure that the condition of the Society continues to be satisfactory.

Since the last Annual Meeting twelve Members have been elected, some of whom are already taking an active part in the affairs of the Society. During the same period death has deprived us of four members, viz. Messrs. J. M. Adye and R. A. Clark, who for some years have been on the country list, Mr. G. H. Hickling, who joined the Society in 1878, and Mr. W. H. Tugwell, who since the second year of the Society's existence had taken a lively interest in its work; he was for many years a member of the Council, and occupied the presidential chair in 1891.

Seven Members have resigned, and the Council, in the exercise of its discretion under Bye-law 10, sec. 2, removed the names of eight Members from the list for non-payment of subscription.

The election of one Member, balloted for during the previous year, has become void.

The effective strength of the Society therefore now stands at 180 Members.

The finances of the Society maintain a sound basis.

During the year four Field Meetings were held, viz.:—

May 18th to *Bookham* and *Ranmore Common*, and on June 29th to *Oxshott*, when many Members availed themselves of the opportunities afforded for spending instructive afternoons in these pleasant and productive localities.

Whit Monday falling on June 3rd, a Field Meeting was arranged to be held at *Brockenhurst* and the neighbouring portions of the New Forest. Provision was made for the convenience of such Members as were able to leave town on the previous Friday evening to take up their quarters at the

rendezvous for the three following days, and the opportunity was taken advantage of by several, while a large number who were not so fortunately situated joined them on the Monday. On the whole, the support given by Members to this new departure may be regarded as satisfactory, and should prove a stimulus to further attempts in the same direction.

The Cryptogamic Meeting held on October 16th was so arranged as to fall on the day preceding the Society's Exhibition. The locality visited was *Oxshott*, and a large collection of Fungi, numbering some forty species, many of them rare and otherwise interesting, was made, and when arranged covered a large table at the Exhibition, and formed an exhibit of considerable interest, and the basis of an instructive lecture delivered by Dr. M. C. COOKE.

The Council desires to thank those gentlemen who undertook the management of the above Field Meetings, and is gratified to know that their efforts were appreciated by a large number of members.

The Exhibition was held in the St. Martin's Town Hall on Thursday, October 17th, and was well attended, the improved accommodation afforded by these new premises being much appreciated by exhibitors and visitors alike. The numbers and variety of the exhibits was well up to the average, and attracted considerable attention. Lectures were given by Mr. F. ENOCH on "Insect Architects," and by Dr. M. C. COOKE on "Fungi," as before referred to, and drew large audiences.

The Annual Dinner was held at the Bridge House Hotel on February 26th.

The Librarian reports that one book, "Forbes' Starfish," has disappeared from the Library without his knowledge; if any Member has inadvertently omitted to return that or either of the books previously lost, viz. Douglas' "World of Insects" and Cameron's "Phytophagous Hymenoptera," Vol. III., the Librarian will be pleased to hear from him.

The following additions have been made to the Library



during the year, and the thanks of the Society are due to the respective donors:—

“Wayside and Woodland Blossoms” (by E. Step), and “The Royal Natural History,” Vols. II.—IV., from Messrs. W. F. and N. D. WARNE.

“The Entomologist’s Record,” 1894, from Messrs. HODGES and TUTT.

“The Entomologist,” 1895, from Mr. SOUTH.

“The Entomologist’s Monthly Magazine,” 1895, from Mr. McLACHLAN.

“Science Gossip,” 1895, and “Science Gossip” Index, 1894, from Mr. CARRINGTON.

“The Naturalist’s Journal,” 1895, from Mr. FORD.

“The Zoologist,” 1895, from Mr. NEWMAN.

“Special Index” of “Entomologist’s Record” for 1894, from Mr. HODGES.

“Common Fungi,” by M. C. Cooke, and “The Story of Primitive Man,” by Clodd, from Mr. STANLEY EDWARDS.

“A Naturalist’s Diary,” by Dr. Roberts, and “British Lepidoptera,” by E. C. Meyrick, from Mr. R. ADKIN.

“Address of the Ent. Soc. of Lond.,” 1895, from Mr. HY. J. TURNER.

“Report of the Dulwich Science Society,” 1894–5, from the SOCIETY.

“British Lepidoptera,” Vol. II., from Mr. C. G. BARRETT.

“The Footpath,” from the EDITORS.

“The Geographical Distribution of Scale Insects,” by T. D. A. Cockerell, from the AUTHOR.

“The Entomologist’s Record,” 1895, from Mr. J. W. TUTT.

Mr. W. WEST (Greenwich), who continues to efficiently carry out the duties of Curator, reports that by the kindness of the late South London Microscopical and Natural History Society, three boxes of insects have been presented to the collections.

# THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

BALANCE SHEET FOR THE YEAR 1895.

## GENERAL FUND.

<i>Receipts.</i>				£	s.	d.	<i>Expenditure.</i>				£	s.	d.
To Balance in Hand	...	...	...	...	22	3	4	By Rent (1 year)	...	...	25	0	0
" Subscriptions received, 88 at 7/6	...	...	...	33	0	0	" Attendance (1 year)	...	...	...	2	10	0
" " " 6 " 6/-	...	...	...	1	16	0	" Printing	...	...	...	2	6	0
" " " 10 " 5/-	...	...	...	2	10	0	" Postage, Stationery, and Sundries	...	...	...	4	1	11
" " " 19 " 2/6	...	...	...	2	7	6	" Insurance of Library and Cabinets (Fire)	...	...	...	8	3	
" " " on a/c	...	...	...	2	6								
" Entrance Fees, 13 at 2/6	...	...	...	1	12	6	" Entrance Fees carried to Suspense a/c	...	...	...	6	16	2
" Arrears of Subscriptions received	...	...	...	5	0	6	" Vote to Publication Fund	...	...	...	1	12	6
" Receipts on a/c of Annual Dinner	...	...	...	6	0	0	" Expenses of Annual Dinner	...	...	...	20	8	3
" " " Field Meeting, Bookham	1	17	6	7	17		" " " Field Meeting, Bookham	...	...	...	7	19	11
" Sale of Exhibition Tickets	...	...	...	16	2	0	" Expenses of Exhibition—	...	...	...	10	11	0
" Exhibition Guarantee Fund	...	...	...	4	14	2	" Hire of Rooms, Lighting, etc.	...	...	...	1	17	4
							" Hire of Tables, Cartage, Cloth, etc.	...	...	...	1	7	6
							" Wages and Gratuities	...	...	...	5	12	6
							" Printing	...	...	...	1	5	6
							" Postage	...	...	...	20	13	10
							" Balance in Hand	...	...	...	12	5	4
											£97	6	0

## SUSPENSE ACCOUNT.

<i>Receipts.</i>			<i>Expenditure.</i>		
To Balance	...	£ s. d.	By Balance in Hand	...	£ s. d.
" Entrance Fees from General Fund...	...	3 12 6		...	5 5 0
	...	1 12 6			£5 5 0



# LIBRARY FUND.

	<i>Receipts.</i>		<i>Expenditure.</i>	
	£	s. d.	£	s. d.
To Balance	...	1 7 3	By Subscription to Ray Society, 1893...	1 1 0
" Library Fines ...	...	2 11	" Binding Books	16 9
" Sale of Boxes ...	...	1 10 2	" Balance in Hand	1 17 9
	...	10 6		2 11
		<u>£2 0 8</u>		<u>£2 0 8</u>

# PUBLICATION FUND.

	<i>Receipts.</i>		<i>Expenditure.</i>	
	£	s. d.	£	s. d.
To Balance in Hand	...	3 6	By Letterpress Printing, Binding, etc....	...
" Vote from General Fund	...	20 8 3	" Balance in Hand	...
" Donations	...	15 9 0		...
" Sale of " Proceedings "	...	36 0 9		...
	...	1 3 0		...
		<u>£37 3 9</u>		<u>£37 3 9</u>

# ASSETS & LIABILITIES.

<i>Assets.</i>		<i>Liabilities.</i>	
£	s. d.	£	s. d.
To Balance, General Fund	...	By Rent, Outstanding Accounts, etc.	Nil.
" Suspense Account...	12 5 4	" Balance	28 13 0
" Library Fund	5 5 0		...
" Publication Fund	2 11		...
	1 19 9		...
" Arrears of Subscriptions, £24 6s. 6d., valued at say	19 13 0		...
	9 0 0		...
	<u>£28 13 0</u>		<u>£28 13 0</u>

Examined, compared with Books and Vouchers, and found correct, *January 17th, 1896.*

C. A. BRIGGS,  
MARK H. WINKLEY, } *Auditors.*

## THE PRESIDENT'S ADDRESS.

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GENTLEMEN,

It has been customary for your retiring President at the Annual Meeting of this Society to give a short *résumé* of the year's doings. I do not think it is possible for me to devise a better system than that followed by so many of my predecessors, and I propose, therefore, to devote my few remarks to this subject.

Of the earlier history of this Society—from the years 1872 to 1883—I have little knowledge. I joined the Society in 1884 at the invitation of our first President, now, to our regret, passed from amongst us. I first met Mr. Wellman at those pleasant meetings Mr. Carrington used to hold at the Westminster Aquarium. At that time the Society was under a very dark cloud; it had only forty-four members, of whom two were life members and six corresponding. The total income of the Society amounted to some £16, and we had only about eighty volumes in our library. We have now one hundred and eighty members on our books, our income for the year amounts to £90, and our library contains about five hundred volumes, besides pamphlets innumerable.

We have elected during the year twelve new members. I had hoped for even a larger number, but from what we already know of some of these additions, they will, I feel sure, make up in quality for lack of quantity.

As a further sign of progress, allow me to point to our Transactions. In the year 1883 they consisted of a very small pamphlet of some 24 pages inclusive. The Proceedings for 1895 are, of course, not out yet, although I am credibly informed they are well up to date. Those for 1894 consisted of a closely printed book of 140 pages, containing, I venture to state, material for the information and study of every one interested in natural history or its pursuits.

At our Annual Dinner, held on the 26th February, Mr. J. T. Carrington, in either proposing a toast or returning thanks—I am not quite sure which—suggested that he thought our meetings would be much improved and enlivened if we became possessed of a lantern, as there were many amongst our members who had the opportunity and



the ability to prepare interesting slides, with which they might illustrate and thus add to the interest of their papers and communications.

Our worthy secretary, Mr. Edwards, evidently took the matter to heart, and in the most generous manner presented the Society with a lantern at our second meeting in March. I feel that our special thanks are due to Mr. Edwards for this timely kindness, and I hope sincerely that the possession of such a lantern will be the means of extending the usefulness of the Society generally.

Mr. Carrington has already given us an address on some collecting grounds and the trees there, illustrated with beautifully executed lantern-slides kindly prepared and lent by Mr. Evans. I hope members will bear the lantern in mind, and whenever they have a chance of obtaining or preparing slides, will not fail to seize the opportunity and let us have the benefit of them in due course.

Our Library, under Mr. Turner's able care, has during the year been considerably increased and enriched by many valuable works, mostly acquired by presentation. Apparently our Committee have not seen their way clear to vote any special grant to this object during the past year. I feel our Library cannot be made too complete, and to this end I would remind any members and friends possessed of duplicate copies, that they cannot dispose of them more beneficially or usefully than by presenting them to our Library. The more complete it is, the more it will be used and appreciated.

Our friend Mr. West, of Greenwich, still remains Curator of our collections, as he was in 1883, when I first heard of the Society, and as he has been ever since.

I do not think our collections have grown with the Society quite as much as they should have done. This is not due in any way to laxity on the part of our Curator. With the somewhat sparse material supplied to him he has done wonders. No man can make bricks without straw, nor can a curator work up a good collection unless our members will each take a personal interest therein. I am sure the numerous desiderata do not arise in any way from want of generosity on the part of our members, but rather from want of thought; but when we find so very few members making donations to the collection during the year, I think you will agree with me that it is time we were up and stirring.

I have heard whispers of a probability of this Society becoming the custodians of one of our old collections, unique

in types and interest. Whether that comes to pass or not, a Society of our magnitude, containing so many hard-working entomologists, ought to have a far better type collection; and every one who has duplicates should make a point of looking them out and forwarding them to Mr. West as soon as possible.

There is also room for improvement in another direction, *i. e.* the reading of papers at our ordinary meetings. This is too much confined to a few willing friends, upon whom we are apt to press too hard. Many members at the beginning of last year promised papers. Some have failed to keep those promises, nor have we had the number of volunteers to fill their places that I should like to see. I would respectfully suggest members not only giving their names as willing to read a paper or papers during the year, but in each case offering definite dates, and if possible data, for the purpose. This once booked would spur each individual member on, and he would be more likely to keep his promise than if no date were fixed, and he felt he could put it off from time to time to suit every little seeming necessity that arose.

Our meetings during the year have, I think, kept up their average of attendance and interest, but we need a little more attention in that respect in order to prevent any retrograde movement. Let each member do his best to exhibit anything he may obtain of interest or instruction, at the same time carefully preparing a short written notice for the secretary, in order that none of the special points may be overlooked. Let none of our younger members fail to bring their exhibits forward for fear of their being of little or no interest. Even the commonest specimen may disclose points of interest equal to or greater than the rarest. Had it not been for the attention Messrs. Hawes and others paid to *Hesperia linea*, we might still have been in ignorance of the existence in our midst of *Hesperia lineola*.

It would perhaps be invidious on my part to particularise any of our exhibits during the year, but special reference is due to the two exhibitions of Mymaridæ made by Mr. Enoch. On the 9th May, with the aid of the microscope, he showed us living specimens of that exceedingly rare aquatic parasite on the eggs of the dragon-fly, *Polynema natans* (Lubbock), which, as could be seen, used its wings for swimming, and as regards which Mr. Enoch states he has observed copulation to take place below the surface of the water. On the 12th September Mr. Enoch also showed us a number of specimens of *Trichogramma evanescens*, contributing interesting

notes. I also feel that we owe a debt of obligation for the series of papers on the *Zygænidæ* read by Mr. Tutt.

We have had four Field Meetings during the year, and very successful they have been. There is a tendency towards eliminating these meetings from our programme, but I sincerely hope that the time when they will be discontinued is far distant. Possibly for the young ardent collector they may prove somewhat slow, but to those of us who are getting more or less removed from the ardour of youth, these friendly reunions are always exceedingly pleasurable. The receipt of hints and lessons in practical woodcraft from our more experienced fellow-members, the identification *in situ* of plants, larvæ, &c., and the general assistance always so freely rendered, give, I am sure, a special zest and interest to our favourite study.

On Whit Monday a novel excursion was organised to the New Forest, where arrangements were made for members spending two or three days. Those who went enjoyed the trip so much that I understand the experiment is to be repeated. Speaking for myself, our pleasantest meeting was on the 29th June, when we had a full attendance of members at Oxshott and Esher. The day was somewhat overcast, but good work was done and a very pleasant afternoon spent by those who attended. These Field Meetings afford a reunion not only for our members, but a means of introducing friends who may in time become members, and for this reason alone I think they should be added to rather than done away with. In addition to the three fixed field meetings there was a Fungus Foray for our Exhibition. The attendance was very sparse, but perhaps it is not to be wondered at considering the time of year. Notwithstanding this, the members who did attend were eminently successful in securing a fine collection of fungi for the Society's Exhibition.

At the risk of being considered importunate, I wish again to refer to our Album. My plea for doing this now is the hope that my remarks may reach some of our older members who are not regular attendants at our meetings. I do feel that, with the uncertainty of life and the many changes that are daily taking place in our midst, it behoves every one for our common interest to make our Album as complete as possible. It is not a very heavy matter for each member to contribute his portrait, if he will only make up his mind and do it at the earliest convenient moment; and we shall then require that second volume which I shall have great pleasure in supplying whenever it is needed. How interesting to us



all it would be to see our fellow-workers and co-members, and especially those who have passed from amongst us, represented in the annals of our Society, not only by their works, but by their counterfeit presentments, does not require any particularising on my part.

There is one special subject of interest which has occurred during the year to which I feel bound to devote a portion of my address, and that is our Exhibition. I notice we always describe it as our Annual Exhibition, although for some reason or other it has remained in abeyance since 1892. Our arrangements this year were made on a scale and in a style surpassing anything before attempted, and the result, both financially and as regards the interest of the exhibits and the attendance of our members and the public generally, exceeded our most sanguine expectations. For the first time in our existence we crossed the Thames—that Rubicon of some of our older members. I cannot say that I did this without any feelings of regret, but we practically had no choice. Partly owing to our inability to fix dates with our former host at the Bridge House, we were obliged to seek fresh quarters, and although Messrs. Billups, Briggs, and others devoted a large amount of time towards finding suitable premises in the district, they were unable to do so. I think our Committee of Management are to be much congratulated on having secured such a conveniently situated building for the purpose as St. Martin's Town Hall. The lighting was excellent, and the space at our disposal larger than we have ever had before. Our committee were therefore enabled to provide ample accommodation for an unique and interesting series of exhibits. To particularise would be impossible in an address of this description, but I cannot avoid specially referring to the magnificent collection of eggs of Mr. J. A. Cooper, whose kindness in once more taking so much trouble for our pleasure and support, I feel I cannot sufficiently repay.

Mr. Enock, with his usual kindness, gave us a couple of particularly interesting lecturettes, illustrated with slides as true to nature as one might expect from so careful a student. Dr. Cooke also gave us a lecture on Edible Fungi, coupled with some admirable advice on the subject, which I have no doubt all our members will take to heart. Subsequent to the lecture Dr. Cooke gave a short series of practical lessons to all interested in the subject, illustrated by the specimens collected at the Fungi Foray before mentioned. The entertainment of all those who were there was further promoted

by a concert ably got up and conducted by Mr. W. Latter, R.A.M., with whose musical excellence I am pleased to say most of our members are well acquainted.

Now, gentlemen, I can assure you that the members of our Exhibition Committee worked hard, and I do think the thanks of the Society generally so kindly vouchsafed to the Committee were well earned. I recommend you on all future occasions specially to see that you secure the services of our worthy Treasurer, Mr. Adkin, on that committee; his energies were untiring, and no small amount of the success of the Exhibition was due to the arduous labours bestowed on the arrangements by himself and Mrs. Adkin. To them and to our numerous friends who so kindly contributed to the success of the entertainment by loans of exhibits, their personal assistance, and in sundry other ways, our gratitude is not only due, but freely given, and I think the manner in which our junior members came forward and assisted us is proof, if proof be required, of the good these exhibitions do, and the thoroughness of our Society's work. Possibly some of our members may ask, Was the exhibition a success financially? Well, that depends on so many things, but I think I may say it was. We did not *quite* pay our way, it is true, but our Exhibition was unique, not only as regards the change in locality and its general excellence, but in that the Society as a society was not called upon to pay one sixpence towards the expenses. A few members formed a guarantee fund, but even they were only called upon for quite a trifling subscription.

Certain members have been known to question the desirability of these annual exhibitions being held. Personally, I am convinced that they are a decided source of strength, not only to the Society in particular but to natural history in general. They do a great deal towards removing a very loose but somewhat general impression that natural history is only a pursuit for children, or cannot be made interesting or useful to even the average adult. To our Society they are useful by way of recruiting our ranks and introducing fresh blood. Many of our members can be traced back either directly or indirectly to the agency of our Exhibitions. In addition to which one meets friends from the country who are seen at no other time, and the same may be said of the special rarities or gems from the collections of many of our best naturalists, whose cabinets, either on account of distance or from other causes, are not open to the inspection of naturalists at large. I believe on this occasion, no doubt

owing to our central position, we got into the Exhibition several of the British public who had no particular tendencies towards our hobby. I hope that may be the means of leading at least some of them to take a deeper interest in the subject. It has been suggested that we had rivals or even superiors in this field. I cannot admit the fact. Our Exhibition was beyond anything of the kind done before, and I feel sure that with the experience gained on this occasion our future exhibitions, which I do hope and trust we shall succeed in making literally annual, will be as far superior to the one held this year as this year was in advance of previous ones. There are one or two suggestions in connection with the subject I feel bound to specially mention. We were too late with our tickets. The financial portion depends to a large extent on the assistance we get from our members in selling and distributing tickets. Unfortunately, as I have stated, we did not on this occasion get them out early enough. To my mind they should be in the hands of the members on sale or return at least a month or even six weeks before the day of the Exhibition. A little more care is also required in connection with the ticket department generally. I did hear complaints of tickets not reaching their destination, and various little catastrophes in connection with exhibits and exhibitors. These arose mainly owing to our having to crowd too much into the last few days. I can, however, personally vouch for the fact that both the Secretaries and Committee worked hard for the good of the Exhibition and the Society, and I sincerely hope that any little shortcomings on any of our parts will be forgotten and forgiven in the splendid results obtained as a whole. I think also that it is a mistake to make it a one-day show. Few people are aware of the tremendous amount of trouble and energy required in getting up anything of this kind, and I doubt if it is really worth while doing for one night only, and I hope for a change in this direction in the future.

Amongst the many interesting papers published during the year, I was much struck with one on Specialists and Specialism by the President of the North London Natural History Society, and if I may venture, without impertinence, to so suggest, I think it would be a good thing if the members of our Society, without discarding that general knowledge of biology which is most essential to a specialist, would devote their particular attention and energies to some special group or species. The undoubted tendency of the



age is towards specialisation not only in Entomology, but in every department of either science, art, or commerce. The best work is undoubtedly being done by specialists, and it is to specialists we must look for new discoveries and the advancement of science in general.

I have often wondered if some combination of the many Natural History Societies of the Metropolis could be arranged. Union is strength all the world over. This is neither the occasion nor the time to go into any details in reference to such a matter, but the idea of a large central society, with a local habitation and name—a library and collections, second to none, always open for inspection, study, and reference—a meeting-place for biologists generally—does open up a vista ; albeit it is but a castle in the air, pleasant in the extreme.

We have lost by death during the past year four members. The latest in date and most regrettable is that of our President for 1891, Mr. W. H. TUGWELL. The late Mr. W. H. Tugwell was elected a member of this Society in the year 1873. In him we lose another of the links connecting the past generation of entomologists with the present. His loss will be felt by a large circle of friends throughout the kingdom. For more than forty years Mr. Tugwell had been a keen collector of British Lepidoptera. With the exception of the last year or two, during which time he had been more or less incapacitated by ill-health, he had for many years been a most active and prominent member of our Society. Mr. Tugwell was born at Reigate on the 31st February, 1831, and died at his own residence at Greenwich on the 20th September, 1895, at the age of sixty-four, after a long illness from an obscure spinal disease. Notwithstanding this serious illness, his interest in the Society repeatedly manifested itself in the exhibition of any entomological specimens which he thought would interest his fellow members, and as late as October of this year we find him contributing notes on the early stages of the larvæ of *Stauropus fagi* to the "Entomologist." Having selected as a profession that of a pharmaceutical chemist, he removed to London, and for many years lived in the heart of the City, from whence he removed to Greenwich, where he spent the remainder of his days. Mr. Tugwell learnt a good deal of his woodcraft at Tilgate Forest (with the full capacities of which he was well conversant) under Tester, and was *facile princeps* as a collector of those good things which were then first discovered, and are still to be found in that favoured district.

For years he gave close attention to rearing larvæ, and was thus enabled to leave behind him the life histories of a good many of our rarer species, amongst which I may mention *Nola centonalis* and *Acidalia ochrata*. As a field companion he was a most pleasant acquaintance. His intimate knowledge of botany added not a little to the enjoyment of a walk in his company. To use the words of our Treasurer, he died "regretted by all who knew him, and most by those who knew him best."

Another old member we have lost during the year is Mr. G. H. HICKLING, who joined the Society in 1878, but has not, as far as I am aware, been a very active member, at any rate of late years. Of Mr. R. A. CLARK, M.A., who joined the Society in 1890, and died during the summer, I have no knowledge.

Mr. JAMES MORTIMER ADYE, F.E.S., died at Bournemouth on 13th March, 1895, at the early age of thirty-five years. Mr. Adye was elected a member of our Society in 1886, and was well known as a diligent student and collector of the flora and fauna of the New Forest district. It seems that Mr. Adye contracted a severe cold during the previous autumn when collecting in the New Forest, and neglected it, with fatal results, it being followed by pneumonia and pleurisy, and finally by phthisis.

I will now briefly refer to some eminent biologists and workers outside the Society who have been removed from their labours by death during the past year.

Professor CHARLES VALENTINE RILEY, M.A., etc. The sudden news of Professor Riley's death, the result of a fall from his bicycle, which occurred at Washington on September 14th, was a shock to us all. Many of our members had the privilege of meeting Professor Riley at the London Entomological Society, and most of us have made his acquaintance through his numerous publications. He was born at Chelsea in 1843, and had as one of his early friends the late Mr. W. C. Hewitson, who may very possibly have given him that ardent taste for collecting and drawing insects which he has so conspicuously exhibited throughout his career. At a comparatively early age he ran away from home and migrated to America. After filling various occupations, in 1868 he started, conjointly with the late D. Walsh, the "American Entomologist," and shortly afterwards accepted the position of State Entomologist for Missouri. From 1881 to 1894 he was Government Entomologist for the United States, during which time he published many reports, and especially the

journal known as "Insect Life." In 1894 he sent in his resignation, which was accepted. During the latter portion of his life he devoted his time to scientific work, and last summer came over to England. For his practical suggestions in connection with phylloxera he received the gold medal of the French Government, and subsequently the cross of the Legion of Honour.

Professor CHARLES CARDALE BABINGTON, M.A., F.R.S., was born at Ludlow in 1808, and died at Cambridge July 22nd, 1895. Professor Babington was one of the two original members of the Entomological Society of London who still remained to us, the other being Mr. W. B. Spence. He was best known as a botanist, and the author of the "Manual of British Botany," which passed through many editions.

The Right Honorable THOMAS HENRY HUXLEY, LL.D., F.R.S., etc., born on 1st May, 1825, and died 29th June, 1895. It would be superfluous to attempt any detailed notice of the writings or work of Professor Huxley. Possibly no man did more to influence modern thought on questions of natural philosophy and kindred subjects. By his death the world has lost one of its best men.

Major JOHN NATHANIEL STILL, F.E.S., died suddenly on September 23rd, aged 47, whilst playing golf at Whitchurch Down, near Tavistock, Devon. Major Still entered the army in 1867 in the King's Own Scottish Borderers, but retired when purchase was abolished in 1873. He joined the Royal Wiltshire Regiment in 1875, and retired with the rank of Major in 1886. His entomological work, which he recommenced after his retirement, was chiefly done on Dartmoor and other parts of Devonshire. He was a very liberal correspondent, and being able to devote a great deal of time to collecting, he acquired numerous duplicates, which he distributed with a free hand. Major Still was one of the fortunate band that has been recently working the Cornish district for *Lycæna arion*. He acquired a host of entomological friends, amongst whom were Messrs. Bicknell, Stonehouse, and our member Mr. Hawes: and he was a man whose loss will come as a great sorrow to a large circle of entomological correspondents and friends.

The phenomenally hard weather we had at the beginning of the year, following an equally phenomenally mild autumn, must have had an unusual effect on insect life. Birds suffered greatly, and their dead bodies were picked up in hundreds.

The cold winds in spring, followed by hot, dry summer



weather, had a detrimental effect on collecting in the early part of the season; but when things did mend, they mended with a vengeance. On the whole, I think we may count 1895 as a good and prosperous season.

As might naturally be expected, now that increasing interest is being given to biological science, the additions to our British Fauna list are not so numerous as they used to be, but we still have some noteworthy examples, of which perhaps the following are the most interesting:

**Mammalia.**—It is exceedingly rare to have to chronicle any new mammal, but this year we have to add the Irish Stoat (“Irish Naturalist”).

**Lepidoptera** gives us some four additions, viz.:

*Mesogona acetosellæ*, Fab. A specimen of this *Noctua* was taken at sugar by Mr. Thos. Salvage on the 26th October, at Arlington, Sussex, and is the first recorded occurrence of the species in Britain. It somewhat resembles *T. stabilis*, and was identified by Messrs. Barrett and Adkin. The species has a wide geographical range, from Central Russia, through Germany to France, but it is somewhat local. (“Entomologist,” vol. xxviii., p. 317.)

*Tinea vinculella*, H. S., added by Mr. N. M. Richardson, from specimens bred from larvæ taken at Portland. *T. vinculella* somewhat resembles *T. argentimaculella*. The larva of the latter, however, makes no case, whilst that of *T. vinculella* makes a case out of lichen and particles of stone. (“E. M. M.,” vol. xxxi., p. 61; “Ent. Rec.,” vol. vi., p. 156.)

*Sericoris ingratanæ*. A Tortrix, bred by Mr. J. B. Hodgkinson from balsam seed some years ago, and said to have been recently differentiated by Lord Walsingham, who, however, throws some doubt on the species in his article in the “E. M. M.,” vol. xxxi., p. 161. (See “Entomologist,” vol. xxviii., p. 181.)

*Solenobia wockii*, Hein., identified by Mr. C. G. Barrett from a specimen in the collection of Mr. R. C. Beadle, at Sutton Coldfield, who has since taken other examples in the Wyre Forest district. (“E. M. M.,” vol. xxxi., p. 163.)

In **Coleoptera** we have three additions:—*Otiorrhynchus auro-punctatus*, Gyll., added to the British list by Mr. G. C. Champion from specimens captured by Mr. Halbert near Dublin, and has also been recently taken at Portmarnock. (“E. M. M.,” vol. xxxi., p. 133.)

*Bembidium virens*, Gyll., also recorded by Mr. Champion as taken not uncommonly by Mr. Lloyd and himself on the

shores of Loch Maree, Ross; it also occurs in Sweden, Lapland, Finland, Switzerland, and Norway, but is not known in either Germany or France. ("E. M. M.," vol. xxxi. pp. 263, 264.)

*Ochthebius lejolisi*, Muls. and Rey, is added by Mr. W. H. Bennett, captured in pools of stale water at Ilfracombe. ("E. M. M.," vol. xxxi., p. 181.)

**Hymenoptera** gives us four additions:—*Andrena ambigua* and *Halictus angusticeps*, Perkins. Two new species of Andrenidæ hitherto undescribed are introduced by Mr. R. C. L. Perkins, M.A.; the former is allied to and intermediate between *varians*, Rossi, and *helvola*. Linn., and has been taken at Dartmoor *in coitu*. The latter is similar to *H. punctatissimus*, Schenck, but is distinguishable by the difference of the genital armature, and the fact that the tarsi are not at all yellow. Habitat, Sidmouth and Weymouth. ("E. M. M.," vol. xxxi., p. 39.)

*Sciopteryx consobrinus*, Kl., taken in Guestling by Mr. W. Bennett, April 3rd, 1893, and differentiated from *S. cestalis* by the Rev. E. N. Bloomfield. ("E. M. M.," vol. xxxi., p. 24; "Ent. Rec.," vol. vi., p. 55.)

*Sphecodes rubicundus*, v. Hag. A bee new to Britain, and now found to be an inquiline of *Andrena nigroaenea* and *A. labialis*, was discovered by Mr. Sladen, of Dover, on a grassy bank at the edge of his carriage drive, and identified by Mr. Edward Saunders. ("E. M. M.," vol. xxxi., pp. 256–259.)

In **Hemiptera-Homoptera** we also have four discoveries, viz.—

*Aleurodes carpini*, Koch, found on the branches of a horn-beam at Bexley, Kent, by Mr. J. W. Douglas. ("E. M. M.," vol. xxxi., p. 117.)

*Dactylopius hibernicus* and *radicum*, two new species of Coccidæ, named and described by Mr. R. Newstead. ("E. M. M.," vol. xxxi., pp. 167 and 235.)

*Salda Muelleri*, Gmelin, added by Mr. E. Saunders from specimens taken at Scarborough, Aviemore, Horning, and Ballinluig, Perth. ("E. M. M.," vol. xxxi., p. 237.)

**Neuroptera** (three species). *Hydroptila tigurina*, Ris., a species not uncommon in the Ambleside district, and *Oxyethira frici*, Klap, identified by Mr. Morton from a specimen taken in the Rothiemurchus district a few years ago, are both added by Mr. J. J. F. X. King. ("E. M. M.," vol. xxxi., p. 112.)

*Mesophylax aspersus*, Rbr., a Caddis fly new to Britain, is described by Mr. R. McLachlan from a single female taken

by Mr. Claude Morley at Ipswich on 23rd April. ("E. M. M.," vol. xxxi., p. 255.)

**Diptera** (five species). *Psilota atra*, Fln., and *Didea intermedia*, Lw., are admitted as new British Diptera on the authority of the Rev. E. N. Bloomfield. ("E. M. M.," vol. xxxi., pp. 113 and 267.)

*Diastrata unipunctata*, Ztt., added by Mr. R. H. Meade from a capture by Mr. Beaumont at Pitlochry. ("E. M. M.," vol. xxxi., p. 170.)

*Melanostoma barbifrons*. A Syrphid not previously recorded is described in the "Naturalist" for July, by Mr. R. H. Meade, from a specimen captured at Grange-over-Sands in April, 1895. ("Naturalist" for July; "Ent. Rec.," vol. vii., p. 12.)

*Cephenomyia rufibarbis*. A bot fly parasitic on the red deer, new to Britain, described by Mr. P. H. Grimshaw in the "Ann. Scot. Nat. Hist." for July. Two specimens were captured by Mr. L. W. Hinxman at Strathcarron, Ross, in June and July, 1894. ("Ann. Scot. Nat. Hist." for July; "Ent. Rec.," vol. vii., p. 11.)

Amongst our occasional visitors and rarer species may be noted the following:

*Pieris daphidice*. Four specimens in a worn condition being taken by Col. Swinhoe at Deal in August.

*Chærocampa celerio*, recorded by that careful observer, Mr. Sidney Webb, as having been found dead in a book-case by Mr. Fenn at Dover. Another specimen was taken by a gardener at Upper Clapton on September 7th, and identified by Mr. F. J. Hanbury.

*Deilephila livornica*, reported from Devonshire by Mr. F. J. Briggs, taken on June 2nd, also on July 1st, at Preston, Brighton by Mr. C. E. Morris.

*Sphinx convolvuli* has occurred during the year in immense numbers, and it is estimated by Mr. Tutt that something like 500 specimens have been captured during the year. In addition thereto, larvæ have been pretty freely taken, and, as some of you are aware, have been exhibited at our meetings.

*Sphinx pinastri* is once more reported from Rendlesham, Woodbridge. This species has now been regularly taken and bred in more or less abundance for the last five years successively, and is entitled undoubtedly to rank as a British insect.

*Nyssia lapponaria*. Mr. W. M. Christy has been successful in breeding this rare insect from larvæ taken in Scotland in



1894. The only other British example was a single specimen understood to have been taken by one of Mr. Meek's collectors at Rannoch in 1871, and which was sold at Mr. Philip Harper's sale for £14. The insect is stated to be found on the Continent only in Lapland and the Upper Engadine, and is supposed to be an alpine and boreal form of *N. pomonaria*.

*Xanthia ocellaris* has been recorded in considerable variation from many localities: Mr. C. G. Barrett from near Wimbledon in October, 1894; Mr. W. H. B. Fletcher at Bognor; the Rev. J. H. Hocking at sugar and also at light on September 7th and 17th, and at Copdock Rectory, Ipswich; and elsewhere.

*Xylina zinckenii* was taken by Mr. Hocking at sugar at 6.45 p.m. at Ipswich on September 30th.

*Plusia moneta* has also been again recorded from many localities—Bromley, Reading, Tunbridge Wells, Norwich, &c., &c.

*Catocala fraxini*, taken in a house at Clive Vale, Hastings, by Mr. Langdon on September 25th, and also at Farnborough, Kent, by Mr. Hope Alderson on August 23rd.

*Callimorpha hera* has been bred in large numbers, and will soon cease to be a rarity. *Pachetra leucophæa*, *Nonagria canna*, *Viminia albovenosa*, and *Agrotis cinerea* have all been fairly common, whilst *Lycæna arion*, as a British insect, has taken one more step towards extinction.

There has been no falling off in either the quantity or quality of the literature relating to natural history published during the year. It is impossible for me to do more than call your attention to a few of the more prominent contributions. Possibly THE book of the year is Mr. Edward Meyrick's "Handbook of British Lepidoptera;" the more one studies it—as study it every entomologist must—the more one gets bewildered in the multitudinous and radical changes it presents. Whilst giving every praise to the learned author for his ingenious argument and undoubted original work, I think every entomologist feels that the author is relying too much on a single character for his classification, and that, as the Editor of the "Record" remarks, the lines on which a new scheme of classification wants formulating must be compounded of the work done by specialists in various lines of work rather than on any one special path to the neglect of the others.

Dealing wholly or in part with classification, we find Pro-

fessor and Mrs. Comstock's "Manual for the Study of Insects," and Professor Grote's "Systema Lepidoptera Hildesiæ," also a valuable work by Professor L. C. Miall on the "Natural History of Aquatic Insects," containing chapters on their physiology and anatomy.

The fifth volume of the "Cambridge Natural History," treating *inter alia* of insects by Dr. David Sharp, has also recently appeared. The more popular orders of Insecta are not dealt with in this volume, but to the specialist who may wish to learn something of those other orders the book will be valuable.

Amongst the many interesting papers published during the year, the first place for original work should, I think, be given to Dr. Chapman's two papers, the one on "Notes on Butterfly Pupæ, with some remarks on the Phylogenesis of the Rhopalocera" ("Ent. Record"), and the other entitled "Notes on Pupæ," in the Transactions of the Entomological Society of London. Other papers calling for particular attention are Mr. Oswald Latter's notes on the "Secretion of Potassium Hydroxide by *Dicranura vinula*, and Similar Phenomena in other Lepidoptera," also published in the Transactions of the Entomological Society. A paper by Mr. F. Gowland Hopkins, on the "Pigments of the Pieridæ," which points out an actual chemical test for mimetic species of whites, published in the Transactions of the Royal Society. Dr. Weissmann's paper on the "Seasonal Dimorphism of Lepidoptera." Mr. Tutt's attempt to correlate the results arrived at in recent papers on the Classification of Lepidoptera in the Entomological Society's Transactions; and Dr. Dixey's translation from the German "On the Cause of Variation and Aberration on the Imago Stages of Butterflies," published in "The Entomologist." We have also the continuation of Mr. C. G. Barrett's great work on "The Lepidoptera of the British Islands," and the commencement of a handbook on "British Macro-Lepidoptera" by Mr. B. G. Rye; whilst for less scientific readers we have the continuation of "The Royal Natural History" published by Messrs. Warne, and a pocket guide to British Wild Flowers by our late president, Mr. Step.

It now only remains for me to thank you, gentlemen, one and all, for the honour paid me in electing me as your president, and for the unvarying consideration you have exercised towards me during the past twelve months, and most cordially to congratulate you on your ratification of

the choice the Council has made of my successor in the chair. Mr. South, whose return to London we all welcome, is well known to you, having filled the chair eleven years ago, and I am sure we may all feel that under his presidency the Society will continue to flourish, and that we as a Society may long look forward to that career of continued progress and renewed prosperity which we all desire and I think deserve.

THOS. WM. HALL.



## ABSTRACT OF PROCEEDINGS.

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JANUARY 10th, 1895.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Thornhill, Castle Cosy, Ireland, and Mr. Brooks, Grange Hall, Rotherham, were elected members.

Mr. C. G. Barrett exhibited a specimen of *Hydrilla palustris*, Hb., from Wicken Fen, and four specimens of *Caradrina ambigua*, Fb., from the Isle of Wight. One of the latter had an imperfect right fore-wing, presumably caused by an injury during the pupal stage. The hind margin was indented, but the cilia were present in the curve. The orbicular and reniform stigmata had run together, while the wings were in a semi-fluid condition in the pupæ, to form one compound blotch by the coalescence of the margins. Mr. Tutt referred to a specimen of *Agrotis exclamationis*, L., in the possession of Mr. Burrows, which had a similar indentation in the lower margin, extending to the claviform spot, and also fringed up the break. This injury had no doubt been caused during the pupal stage, and while the wings were in a viscous condition. The result of the injury to the markings was a separation of the claviform spot into two distinct margined spots.

Mr. Tutt stated that some time ago he had reported *Caradrina superstes*, Tr., as being taken in the Isle of Wight. He now said that he was in error, the specimens being a form of *C. ambigua*, Fb. He thought that he possessed specimens of *C. superstes* from Deal, and as Mr. Prout was going into the whole matter no doubt before long the difficulty would be cleared up. Unfortunately he had figured the species. There were in this genus two parallel pairs of species, viz. *C. blanda* and *C. alsines*, and *C. ambigua* and *C. superstes*, the first in each pair being ochreous, and the second greyer.

Mr. W. A. Pearce exhibited a bred specimen of *Acherontia atropos*, L. It was stated that the imago of this species

forced its way through the earth, the pupa being destitute of free segments which would enable it to work itself out.

Mr. R. Adkin exhibited specimens of *Vanessa urticae*, L. Three examples bred from larvæ taken in Sutherlandshire. In one the central, costal, and inner marginal blotches were united. He also exhibited a wasp's nest found in a hogs-head of tobacco from U.S.A., with the insect *in situ*.

Mr. Carrington exhibited several specimens of flint from Chatham, Kent, having dendritic crystals upon them. He said that they were comparable with Mocha stones, which were agates having a beautiful arborescent pattern in them. The people of India were most skilful in cutting these stones so as to show the patterns to advantage with only an exceedingly thin film over them. This pattern was a deposit of oxide of manganese, and the theory was that fissures had become saturated with a fluid containing the oxide, which when the fluid (most likely water) evaporated was deposited in these beautiful arborescent patterns. Such crystals in copper, taken from rock fissures, but of course very much larger, were to be seen in the Geological Museum, Jermyn Street. Many of the recently broken flints by the road side had these patterns on them. It was best to varnish the specimens to prevent the crystals being dissolved by moisture or rubbed off.

Mr. Tutt referred to a most interesting change in number of spots within recent times in *Zygana trifolii*, Esp. He said that some fifteen years ago Mr. Ovenden and himself used to take this species in two fields some distance apart. In one field the species suddenly disappeared, and in the other it gradually died out. They were of two distinct forms, all small but genuine five-spotted *Z. trifolii*, yet having amongst them one or two specimens with six spots. They were always to be taken the first week in June, while the true *Z. filipendulæ* never appeared until a month or six weeks later. In 1891 the species suddenly appeared in abundance in one of the fields at the beginning of June, but strange to say only six or seven undoubted *Z. trifolii* were among them. About thirty of those taken had an indistinct sixth spot, while all the rest were to all appearances true *Z. filipendulæ* forms except in size. Reference was made to Mr. W. H. B. Fletcher's experiments with the British *Zygænidae*, showing that the *filipendulæ* character would assert itself in most of the broods. He also said that Messrs. Boden and Richardson had reported cases of early *Z. filipendulæ* with a faint sixth spot. Mr. Briggs had early

forms from Folkestone. Mr. Barrett mentioned several instances, and said that he had taken the early form at Pembroke. Mr. Adkin had taken all stages of a six-spotted form early in June, and Mr. Frohawk's experience was similar. It was remarked by several members that *Z. trifolii* did not always pupate near the ground.

Mr. Carrington gave a short summary of the increase and spread of Melanism during the last twenty years. Black varieties of *Tephrosia biundulata*, Bork., *Amphidasys betularia*, L., and *Phigalia pedaria*, Fb., were either exceedingly rare or absolutely unknown a few years ago, whereas of the first named no less than forty-three specimens were taken last year by Mr. Hewett of York alone, while black vars. of *A. betularia* had even been found at Epping and in Ireland. All these changes in species taking place within our own lifetime could not but have a very large influence upon the old idea of species being immutable. In fact, his experiments with trout and salmon had forced upon him the belief that the seven so-called species of Salmonidæ were but one. The undoubted ova of the salmon had been sent to the Himalayas and had produced equally undoubted ordinary brook trout.

Mr. Brooks communicated the following note :—

“A question was asked at the last meeting, December 13th, *re* the Florida orange being without pips or seeds, and consequently being unable to multiply in the usual way.

“In the first place, the Florida orange is a hybrid, and in all probability raised from a hybrid parent on one side. Therefore Nature refuses to go any farther in a direct line.

“But in order to still improve the Florida orange, the pollen would have to be removed to another kind with a stronger constitution.

“The little Otaheite orange is without seed or pips, being also a hybrid.”

Mr. J. W. Tutt read a paper on *Zygæna ochsenheimeri*, Zell., and its varieties (printed in Abstract of Proceedings for 1894, p. 111).



JANUARY 24<sup>th</sup>, 1895.

## ANNUAL GENERAL MEETING.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

The Reports of the Council and Treasurer were read, and the Officers and Council for the year were elected as under:

*President*.—T. W. Hall, F.E.S.

*Vice-Presidents*.—C. G. Barrett, F.E.S., J. Henderson.

*Treasurer*.—R. Adkin, F.E.S.

*Librarian*.—H. J. Turner, F.E.S.

*Curator*.—W. West (Greenwich).

*Hon. Secretaries*.—Stanley Edwards, F.L.S., &c. (*Corresponding*), H. J. Turner, F.E.S. (*Report*).

*Council*.—T. R. Billups, F.E.S., C. A. Briggs, F.E.S., J. H. Carpenter, C. Fenn, F.E.S., F. E. Filer, W. Mansbridge, F.E.S., W. A. Pearce.

In the absence of Mr. E. Step, the retiring president, Mr. Hall, read the annual address, which had been forwarded to him for that purpose.

FEBRUARY 14<sup>th</sup>, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. W. Furneaux, of Ommaney Road, New Cross, was elected a member.

Mr. C. A. Briggs, on behalf of Mr. Carrington, exhibited specimens of the fruit of *Euonymus japonica*, from Ventnor, Isle of Wight. Mr. Mansbridge remarked that it was very unusual for this plant to produce seed in Britain, and said that he noticed only one seed on each stem had come to perfection, showing the unpropitious circumstances. No doubt the Isle of Wight was its extreme northern limit. He asked if members had noticed how completely the berries of our common *E. europæus*, L., were ignored by birds.

Mr. Peach exhibited a specimen of the genus *Xanthia*, said to be *X. ocellaris*, Bork., captured at Wimbledon in 1894, but the general opinion of the meeting was that it was only a variety of *X. gilvago*, Esp. Mr. Tutt stated that Continental specimens of *X. ocellaris*, which he had, were very distinct in appearance from *X. gilvago*. Whether they were

one and the same species could only be decided by breeding. Messrs. Adkin and Henderson had received specimens from Hythe and Berks respectively to all appearance similar to the specimen exhibited, and which they considered only varieties of *X. gilvago*.

Mr. Robert Adkin again exhibited a variety of *Vanessa urticae*, L., from Sutherland, together with three examples bred during last autumn by Mr. Bonaparte Wyse, of Londonderry, Ireland, in which the central costal and inner marginal black blotches were similarly connected by a more or less distinct black band. He said that it was interesting to find that in a species not generally liable to great variation in its pattern, similarly marked varieties were appearing in two distinct localities in the British Isles at one time, and that it was still more so to find that this form closely resembled the prevailing Japanese form, which had been named by Butler *Vanessa connexa*, evidently under the erroneous impression that it was a distinct species.

Mr. Adkin also exhibited examples of *Zygæna filipendulae*, L., taken last summer on Mount Suliven, in Sutherland, at an elevation of about 2000 feet above sea level, in a position where it was open to conjecture what could possibly have supplied the larvæ with a suitable pabulum; and pointed out that there was no material difference between these examples and those which had been reared under more favourable circumstances on the Kent and Sussex Downs, their size even agreeing with many of those from the last-named localities.

Mr. Tutt suggested that the variation in *V. urticae* was simply due to a failure in the development of pigment, and stated that Mr. Coverdale had washed out the pigment from the scales of certain *Vanessas* by some acid, and found the scales themselves consisted of black structure. Mr. Hall had captured similar specimens, and several members considered that hard fare and semi-starvation had diminished the amount of matter available for the development of the ordinary pigment granules.

Mr. H. W. Williams exhibited specimens of *Anthocharis cardamines*, L., together with specimens of the so-called *A. alberti*, Hoffm., and contributed the following note:—

“In the ‘Entomological Record’ for February of this year (vol. vi., p. 31) is a note, extracted from ‘Das Naturalien Cabinet’ for September, 1894, respecting a supposed new species of *Anthocharis*, which M. Ernest Albert, by breeding, has come to the conclusion is a form of *A. cardamines*, L.,

resulting from larvæ fed upon *Arabis perfoliata*, Lamk., the Smooth Tower Mustard.

"In addition to his differentiation in the larvæ, he says that the orange in the male imago is more fiery on the upper side than in the type; whilst on the under side the space between the base of the wing and the orange tip is shaded with sulphur yellow, and in the female the upper side of the hind wing is slightly yellow.

"On reading this brief description, I was at once reminded of some specimens which I captured in Suffolk, and on examination these appear to be very similar to the form mentioned, and which Herr Hoffman considers sufficiently distinct from *A. cardamines* to be named *Anthocharis alberti*. These specimens are now shown, the first five being from Suffolk, June, 1891. Specimens Nos. 1, 2, and 3 (males) all show the sulphur-yellow marking on the under side of the fore-wing, No. 2 rather more intensely than the others; and Nos. 4 and 5 (females) show a slight yellowish suffusion of the upper side of the hind wings, whilst this also occurs in No. 1, a male, though this is not one of the characteristics mentioned by M. Albert. No. 6, a male, from the neighbourhood of Edgware, shows the yellowish under side, whilst Nos. 7, 8 and 9, from Edgware and Horsley, seem to be typical specimens, and are here shown for the purpose of comparison.

"These are selections from a fairly long series of my own, but I would point out that the characteristics of this supposed new species occur sparsely amongst specimens from nearly all the localities which I have represented, though more numerous amongst those from Suffolk. The Rev. C. A. St. Johns, in his 'Flowers of the Field,' says that *Arabis perfoliata* (*Turritis glabra*) grows most commonly in Norfolk and Suffolk, and therefore there may be a connection between this plant and the form of *A. cardamines* referred to, it being probably a phytophagic variety, as Mr. Tutt suggests; but it would be interesting for every one to make a careful examination of their series, especially if the specimens have been bred, so that more evidence may be adduced either for or against *Anthocharis alberti*.

"My own idea is that this is a form that one would expect to get from a larva fed upon an abundance of nourishing and stimulating food, and that the suffusion of orange colouring is probably the effect due to excess of energy resulting from the aforesaid cause."



FEBRUARY 28th, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. Beauman, of 18, Victoria Road, S.W., was elected a member.

Mr. Stanley Edwards exhibited larvæ of the Dipteron *Eristalis tenax*, L., found in some water in the stump of an old apple tree.

Mr. R. Adkin exhibited a series of *Crambus ericellus*, Hb., from Sutherlandshire. A discussion ensued as to the discriminating character of this species from *C. pascuellus*. Mr. Barrett stated that the silvery stripe in this species was always narrow and even, and that the spot beyond was as nearly as possible in the same line. These he considered to be the most reliable points of difference. Mr. Adkin said that some small dark *C. dumetellus* from Aberdeen ran very close in appearance.

Mr. Mansbridge exhibited a skin of the rattlesnake (*Crotalus durissus*), and a rattle, from the Indian Territory, U.S.A.; also a cast skin of the black snake (*Bascanium constrictor*).

He stated that the sound of the rattle could be heard a very considerable distance, and resembled an intensified hiss. The dogs were not afraid of the rattlesnake, but would dash in and kill it, while the very poisonous black snake was never attacked by the dogs, who seemed instinctively to know the danger. He also stated that large numbers of rattlesnakes every year crossed the Mississippi from the Western plains and hybernated in the rocky "bluffs" of the Eastern shores, recrossing in spring. This fact was taken advantage of by men, who killed them at this time for the oil their bodies contained.

Mr. Tutt exhibited Continental specimens of *Xanthia ocellaris*, Bork., and pointed out the distinguishing features from *X. gilvago*, viz.:—1. The lower part of the reniform stigma was white. 2. The nervures were well dotted with white scales. 3. The apex of the wing was different. He stated that some German authorities considered the two species as merely well marked geographical races, and possessed a graded series of forms uniting both. In his opinion, the specimen exhibited at the last meeting was certainly not *X. ocellaris*.

Mr. Tutt read a paper entitled "*Lithosia lutarella*, L., and its varieties" (printed in full "Ent. Rec.," vol. vi., p. 217), and illustrated it by a magnificent series from Deal and the Alps.

MARCH 14<sup>th</sup>, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. B. G. Rye, of Fulham Road, S.W., was elected a member.

Mr. Frohawk exhibited a long and magnificent series of *Vanessa c-album*, L., consisting of one hundred and fifty-four specimens, being part of a brood, bred from ova deposited by a hybernated female captured in Hereford last April, and showing the remarkable difference of the two forms (light and dark). Some of the light forms were exceptionally light and large. The first emerged on June 30<sup>th</sup>, the last on August 2<sup>nd</sup>. The pale forms were the first to emerge. (For full particulars of this brood *vide* "Entomologist," 1894, pp. 257—287.)

A long and interesting discussion ensued. Mr. Tutt said he believed that only the dark form of this species was found after hybernation in the spring. He was in considerable doubt whether the species was wholly double brooded, and suggested as an explanation of the various facts, that the dark form did not reproduce during the same season as it emerged, but went into hybernation, while the light forms at once proceeded to copulate and lay; the coloration being the outward and visible sign of the dimorphic nature. The second brood consisted very largely of light specimens. In confirmation of these views, he said that Mr. Merrifield's experiments showed that a pallid coloration was coincident with rapid development. Mr. Mansbridge referred to a dimorphic American species, *V. interrogationis*, F. The autumn form was dark, *V. fabricii*, Edw., and was the only form found after hybernation, whereas the summer form was considerably paler. Messrs. Barrett, Carrington, and others also took part in the discussion.

Mr. R. Adkin exhibited a series of *Melanippe hastata*, L., taken in Sutherland in 1894, which were of interest as being intermediate between the southern and more suffused forms of some of the more northern localities.

Mr. Sauzé exhibited a living specimen of *Ædipoda tartarica*, one of several locusts imported in garden produce from Italy.

Mr. A. Hall exhibited a Pierine butterfly, *Ithomia patilla*, Hew., together with the Danaine species *Dismorphia fortunata*, Luc., from Nicaragua, which it resembled.

Mr. R. South communicated a paper on "Nettles," in which he discussed their use in Nature, their relation to other plants and to insects, and considered them both from an entomological and economical point of view.

An interesting discussion ensued on Hybernation, Messrs. Robinson, Tutt, Carrington, Barrett, and others taking part.

Mr. Edwards exhibited four varieties of *Papilio memnon*, L., also *P. segonax*, from New Britain; *P. westwoodi*; a pair of *P. epycides*, Hew., from Khasia Hills, India; a pair of *P. anticrates*, Cram., India; a female *P. pammon*, L., var. *javanus*, Feld., from Sardakhan; and one *Thecla tuneta*, Hew., from Central America.

MARCH 28th, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. Ashby, of Maida Vale, N.W., was elected a member, and Mr. H. Woods, of Ashford, Kent, a country member.

Amongst the donations to the Society was a handsome lantern and screen, kindly presented by Mr. Stanley Edwards, F.L.S., for demonstration purposes.

Mr. Fenn exhibited a long series of *Selenia illunaria*, Hb., comprising three generations of specimens. The ova, received from Mr. Fletcher, were the result of a pairing between Scotch and Yorkshire spring specimens. The first generation emerged from June 15th to 29th, 1894; the second from July 31st to August 23rd, 1894; the third in March, 1895.

Mr. Carrington gave an interesting address entitled, "Some Collecting Grounds and the Trees there," illustrating his remarks by a large number of very admirable lantern slides, executed and kindly lent by Mr. Fred Evans.

Commencing with views of Theydon Bois, showing the characteristic growths of beech and hornbeam both when lopped and unlopped, he showed pictures of glades, foot-paths and rides leading on towards Monkswood, the special resort of *Stauropus fagi*, L. The views were mostly taken during early spring, before the luxuriant growth of leaves had hidden the more artistic blending of the twigs and branches. Then came some views of the fine beeches in Norbury Park, showing the yews bordering the rides one traverses on the northern slope of the chalk downs. In places there were patches of melting snow, which produced a very striking and beautiful effect, especially in one view



where a sudden driving squall of snow coming along the ride was photographed before it reached the operator. Scenes from Holmwood and Coldharbour were next shown, as well as one or two from below Leith Hill. Redlands district was then portrayed, and the groups and avenues of larch and Scotch fir were very well reproduced, especially some rides which were covered by interlacing branches so closely as to appear dark even on a bright day. From near Abinger came a view of a group of silver pines with patches of snow, and in many of the scenes the bilberry, so common all along the sandy hills south of the North Downs, was strongly in evidence. After urging entomologists to explore some of the places he had referred to, and deprecating the custom of many to go year after year to the same localities, he showed a number of views of well-known spots in the New Forest. The heathery landscape near Stoney Cross, the banks of waving bracken, the shady rides studded with beeches, the winding forest roads, were all beautifully pictured and admirably described. The mossy knobs and the roots of a massive beech were much admired. Views of holly and beech growing together, a young beech growing out of an old one, and an enlargement of the base of a splendid spruce with cones scattered around it, concluded a series of beautiful illustrations and a most interesting address.

APRIL 11th, 1895.

C. G. BARRETT, Esq., F.E.S., *Vice-president*, in the Chair.

Mr. Winkley, on behalf of Mr. A. M. Montgomery, of Ealing, exhibited a bred series of *Nyssia hispidaria*, Hb., and contributed the following note :—

“The female was captured at Richmond on February 18th, 1894, during a very cold east wind which was succeeded by a sharp frost at night. The eggs were laid in and under small pieces of bark in a chip box : 250 to 300 larvæ emerged on April 3rd and 4th, and a few on the two following days. As the oak was not in leaf, elm, birch, and whitethorn were substituted, on the latter of which the young larvæ fed readily until oak was obtainable. The first moult began on April 9th, the second April 13th, the third April 18th, and the fourth April 26th. On May 6th the larvæ began to go down, and all had buried themselves by May 20th. Larvæ in shallow mould came up again to the

surface, and when transferred to deep earth some died, apparently exhausted and unable to burrow again. The pupæ were dug up on Nov. 18th, when 141 were found to be alive. No pupæ were less than six inches below the surface, many more than eighteen inches down. The earth was ordinary garden leaf mould, and was placed in two-foot chimney-pots. The first emergence took place on December 26th, and altogether about 110 moths came out, the sexes being in about equal proportion."

Of the specimens exhibited, one male was whitish without the central band, having the transverse lines and apical streak dark grey, and hind wings also of the whitish colour. Another was uniformly smoky black. Between these two extremes there was a complete series of intermediate variation. The females also ranged from black to brown.

Mr. Edwards exhibited a pair of *Dynastor napoleon*, from Rio de Janeiro, and a female of *Caligo martia*, also from Brazil.

Mr. Sauzé said that recently he had observed a number of specimens of turbot (*Rhombus maximus*) with both sides of a uniformly dark colour, and also several specimens of the garpike (*Belone vulgaris*), which hunts the mackerel. Both Mr. Winkley and Mr. C. A. Briggs stated that they had observed the variation referred to in most flat fish.

A discussion then ensued as to the present season, Messrs. Auld, Barrett, Tutt, and others taking part. It was generally considered that the present spring appearances were some three weeks later than last year.

APRIL 25th, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. Ashdown, of Leatherhead, was elected a member.

Mr. Frohawk exhibited a specimen of *Papilio machaon*, L., having ochreous yellow blotches at the anal angle of the hind wings instead of the usual deep red; the blue markings also were very pale, almost white. It was bred from Wicken pupæ.

Mr. Mansbridge exhibited three melanic specimens of *Phigalia pedaria*, Fb. (one female and two males) from the neighbourhood of Barnsley, Yorks, and remarked that this black form was gradually extending its area in Yorkshire, but is most numerous in the West Riding. A few years ago it was scarcely known, while during the present year Mr. Hewett, of York, had himself taken thirty examples of the

form. They were of all shades, from intense black to brown, and unicolorous. Mr. Adkin said that Mr. South had this year taken a black female at Macclesfield.

Mr. Carrington exhibited specimens of a monstrous growth of *Equisetum arvense*, L., which he had just received from Ventnor. The fertile stems of this species are usually simple, but in these specimens the stems had split into two, three, or more, each of which were clothed with the spore scales. It was considered that when just coming out of the ground they had received some injury, perhaps had been trodden upon, as they were found close together, and only in one spot.

Mr. Moore exhibited a *Pterostichus madidus*, F., which had been attacked by a *Gordius*, some four inches of which had emerged from its body.

Mr. Adkin exhibited a male specimen of the Little Auk (*Mergulus alle*, L.), taken at Filey, Yorks, in February last, when the species was unusually common; and mentioned that the occurrence of specimens at Greenwich in Kent, and Hastings in Sussex, during the recent severe weather had come under his notice. Although the southern range of the species appeared to extend to the Azores and the Canaries, it was certainly not a frequent visitor to the north-east of England, and its being found there this winter was no doubt due to the extreme severity of the weather.

Mr. Turner exhibited a specimen of *Plusia moneta*, Fab., which had been taken in July, 1894, at West Wickham, by Mr. Slade of Hatcham. He also exhibited a short series of *Spilosoma menthastri*, Esp., showing variation. One pair, bred in Brockley, had the spots on the primaries small in size and few in number; while the blotches on the hind wings were very faintly marked. Three of the specimens were from Linlithgow, and showed the usual dark buff of northern specimens in a greater or lesser degree, but the arrangement and coalescence of the spots was very pretty. In one specimen the spots had united to form an almost complete second line, and at the same time an apical streak had been developed. Mr. Adkin said that Scotch specimens were usually dark, but the arrangement of the spots rarely varied. Mr. Barrett said that several white *Bombyces* had no very definite markings, yet varieties occurred having the second line developed, and sometimes even the first line appeared. He instanced both *Porthesia chrysorrhæa*, L., and *P. similis*, Fues, as showing this, and he had seen the character produced in a specimen of *Lælia cænosa*, Hb.

MAY 9th, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. H. Williams exhibited a cluster of cocoons fastened to a twig, apparently those of some species of *Ichneumon*.

Mr. T. W. Hall exhibited a variety of *Smerinthus ocellatus*, L., with a typical specimen for comparison. The variation was in an obscuration of the ocelli. The specimen was bred from a South coast larva by Mr. W. F. Urwick some two or three years ago.

Mr. Carrington exhibited a fasciated specimen of the flower stem of a *Primula*. There were three heads on one stem, one of which was distinct and the others only partly formed.

He also exhibited a number of specimens of *Helix pomatia*, L., very finely banded with a brilliant chestnut colour. They were from Eynsford. Also several specimens from Surrey showing the winter epiphragm. He stated that it had been frequently noted that the young and small representatives of this species were rarely if ever observed. He himself had searched the whole of one afternoon and evening, but found none until dusk and dark, then with a lantern he had lately been successful, finding the young climbing the grass stems, as was the wont of the other species of the genus.

Mr. Step sent for exhibition, specimens of *Scilla verna*, Hudson, and contributed the following note:—

“At the opposite extremity of our little bay the rugged cliffs send out a jagged foot into the water. The top is covered with fine grass, and bears evident signs of having once been a circular earthwork fort. The rocks push through the turf here and there, and are decked with lichen and stoncrop. The edge of the cliff, and every available little ledge, affords foothold for the beautiful sea-pink or thrift (*Armeria vulgaris*), just now in full blossom. On the western slopes of this turfy top, the grass has now a distinctly blue tinge from the presence of thousands of the flower-heads of the rare Vernal Squill (*Scilla verna*, Huds.), a plant that occurs only on the western shores of our country. Here at Pedmadden it is exceedingly abundant, or I would not have taken up entire plants. Those sent herewith were taken from a dense patch seven or eight feet in diameter, and there were several similar patches, as well as thousands of plants in smaller groups around. Several years ago Mr. R.



Adkin exhibited *S. autumnalis*, L., from Blackheath. This is its nearest ally, but it is very distinct. In *autumnalis* the flowers precede the leaves, and are purple with a bias towards red. In *verna* the leaves appear first, and the fragrant flowers are pale blue; the pedicles are provided with a long bract, which is not present in *autumnalis*. Again, the inflorescence in *autumnalis* is a short raceme, whilst in *verna* it more nearly approaches a corymb. Both these species differ from *S. nutans*, Sm., *inter alia*, by having the segments of the perianth free and spreading, whilst in *nutans* they are connected by their bases, and assume a bell shape."

Mr. Enock exhibited specimens of an exceedingly rare fly, *Polynema natans*, Lub., one of the *Mymaridæ*. It was described in 1862 by Sir John Lubbock in the Linnæan Society's Proceedings. This remarkable fly swims in water by means of its wings. It is parasitic, the eggs being laid in the ova of dragon-flies. He had been searching for it some twenty years, but until now quite unsuccessfully. This week a member of the Queckett Club had brought him vials with a strange fly in, and he had since obtained several from the same locality after considerable search. Sir John Lubbock's specimens, now all lost, were from Chislehurst. He showed a male mounted for the microscope, and also a living female swimming in the water.

Mr. Carrington said that we were greatly indebted to Mr. Enock for his interesting exhibit. It was the reward of great perseverance, and showed how much interesting work there still remained to be done in original investigation. Mr. Enock said that if we collected less we should learn more; even the life-history of the common house-fly was not yet written, and of a hundred species of fairy flies the life history of only one was known.

Mr. Mansbridge then read a paper entitled "Prairie Insects."

In the discussion which ensued, Mr. Carrington said that he was much interested in Mr. Mansbridge's remarks, as many of them confirmed his observations in the Canadian prairie regions. The stillness could be almost felt. At times the Cicadas were in vast multitudes, and created an unbearable noise. The bullfrogs could be heard long distances, and were locally known as the "Canadian band." In the Eastern prairies dragon-flies were very numerous, clouds coming out on either side as one walked through the tall grass. As regards to what species the "mosquito" should

be referred he was uncertain; it seemed that many species of *Culex* had the habit of biting very sharply. In some countries it might be one species and in another country a different one. Even the same species might be an intolerable nuisance in one region, while it was comparatively harmless in another. Mr. Pearce spoke of the destructiveness of the swarms of locusts on the mountain slopes of Pennsylvania. If any tool was left out in their path they would even gnaw the smooth handle and make it appreciatively rough to the grasp. The incessant noise of the Cicadas had also impressed him; it was distinctly audible above the noise of a train, and he thought the noise of a circular saw very closely resembled it, except that the latter had no pulsations. His experience of the wasps was similar to that of Mr. Mansbridge; they monopolised every small cavity obtainable; a row of empty cartridge cases on a shelf in his room were all occupied by wasps, and even the small hole in a camera case was repeatedly tenanted. Mr. Warne and others took part in the discussion.

MAY 23<sup>rd</sup>, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. C. G. Barrett, on behalf of Mr. Horne, of Aberdeen, exhibited a long series each of *Agrotis cursoria*, Bork., and *A. tritici*, L., from the north-east of Scotland. The range of variation shown by both species was so great that it was difficult from an inspection of the upper side alone to determine to which species many of the specimens belonged. It was stated that from the East Coast of England very pretty light forms were generally obtained, while from the West Coast of Ireland the usual form was dark or even black. The specimens shown from the North seemed to have a happy combination of these two shades. He also exhibited a gynandrous specimen of *Saturnia carпинi*, L., belonging to Dr. Mason, of Burton-on-Trent. Mr. Mansbridge said that recently half-a-dozen gynandrous examples of this species had been bred at Bonn. They differed from the one exhibited by Mr. Barrett, however, in the wings being alternately male and female. The body was divided down the middle, the external organs being male on one side and female on the other (*vide* "Entomologist," vol. xxviii., p. 164). Mr. Hall said that he possessed a specimen of *Orgyia antiqua*, L., showing similar aberration.

Mr. Edwards exhibited a female of *Morpho cypris*, from Bagota, which he stated was very rare, although the male was fairly common.

Mr. Dennis exhibited ova and young larvæ of *Leucophasia sinapis*, L., and also of *Lycæna argiolus*, L. These were shown after the meeting, under the microscope.

Mr. T. W. Hall exhibited two specimens of *Mamestra persicaria*, L., var. *unicolor*, Staud., with type specimens for comparison. They were bred by a northern collector from a dark specimen, said to have been obtained out of a batch of larvæ from a suburban garden. This specimen was paired with a type form, and the above varieties were the result. It was stated to be very rare in Britain, but fairly common on the continent.

Mr. Hall also exhibited six specimens of a *Eupithecia* from the late Mr. Machin's collection, which that gentleman had labelled as doubtful. Several members considered that they were most likely *E. minutata*, Gn., var. *knautiata*, Greg., which had been bred in Ireland and the West of England from *Scabiosa* (*Knautia arvensis*).

A question was asked as to what measure of success members had experienced in hibernating the larvæ of *Callimorpha hera*, L. Mr. Hall had got a number into pupa, but the severe frost had considerably diminished his brood. It was stated that Mr. Tugwell had been very successful, most of his larvæ pupating safely. Mr. Robson lost the whole of his in the frost, and Mr. Auld had lost four out of the eight larvæ he had during the winter.

Mr. Carrington introduced the subject of the recent felling of trees in Epping Forest, giving an account of the visit of the Essex Field Club, in company with experts from various parts of the kingdom, on Saturday last. In his opinion no harm whatever had been done, and he could see no appreciable difference in any part he had visited. What had been cut was small timber and practically of no value. He thought from an entomological point of view more open spaces in the denser woods would be very beneficial. The general opinion of members agreed with that of Mr. Carrington.

Mr. Barrett, in referring to the last remark of Mr. Carrington, instanced the method of periodically cutting the undergrowth in Surrey and Kent, and remarked how advantageous this was to the entomologist.

JUNE 13th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Frohawk exhibited a dark leaden blue variety of *Lycæna bellargus*, Rott., captured at Weymouth in August, 1892.

Mr. Perks exhibited a *Julus* taken in Covent Garden Market from some bananas which had been imported from the Canary Islands.

Several members, including Messrs. Edwards, Auld, Mansbridge, and Turner, made remarks upon the Field meeting in the New Forest which had been so successful. The general opinion concerning the season was that imagines were scarce, but that common spring larvæ were unusually abundant.

Mr. Mansbridge said the results of his sugaring were very poor, except on one evening which had been a milder one. *Colias edusa*, L., had been seen by several members, and it was hoped that the fine spring would result in an "*edusa*" year.

Mr. Winkley noted the greater abundance of birds in suburban gardens. The missel thrush had been seen in his own garden at Streatham.

Mr. Carrington had been working near Lewes at the Mollusca, and had found, contrary to what is usual, the yellow form of both *Helix nemoralis*, L., and *H. hortensis*, Mull., to predominate over the pink. He had obtained five specimens of the six-banded form of the first-named, and many specimens were markedly more conical than he had previously seen.

JUNE 27th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Jäger exhibited a bred series of *Arctia lubricipeda*, Esp., including vars. *radiata*, Haw., and *fasciata*, Tug., with intermediates, some of which were close to the normal type. The parents were both of the *radiata* form.

Mr. Turner exhibited the curious eggs of the lacewing fly (*Chrysopa vulgaris*, Schn.), which are placed upon long upright stalks.

Mr. West, of Greenwich, exhibited several specimens each of the local *Cryptocephalus nitidulus*, Gyll., the tare *C. coryli*, L., and the common *C. aureolus*, Suf., together



with a specimen of the rare *Elater elongatulus*, Ol., all taken in Headley Lane on June 3rd.

JULY 11<sup>th</sup>, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Fremlin exhibited a long, fine, and variable series of bred *Phorodesma smaragdaria*, Fb., all of which had been set with the use of the blowpipe; also a bred series of *Geometra papilionaria*, L.

Mr. Oldham exhibited a specimen of *Sirex gigas*, L., taken at Wisbeach, and several species of Lepidoptera, which he had captured during the Society's visit to Oxshott on June 29th. Among these were *Eurymene dolabraria*, L., and *Macaria liturata*, Clerck.

Mr. R. Adkin exhibited a yellow var. of *Ematurga atomaria*, L.

Mr. Hall exhibited pupæ of *Sesia sphagiformis*, Fb., and *Eupithecia valerianata*, Hb., the latter from the Croydon district.

Mr. Edwards exhibited *Papilio sesostris*, var. *xestos*, from South America.

Mr. Mansbridge, referring to his exhibit on October 25th, 1894 (Proc., p. 72), of a mole's skin covered with cocoons, said that he had bred therefrom a series of *Tinea tapetzella*, L.

JULY 25<sup>th</sup>, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Hall exhibited a long, variable, bred series of *Dianthæcia carpophaga*, Bork, from Croydon. The larvæ were found feeding on *Lychnis vespertina*, and not, as generally reported, on *Silene inflata*. The most remarkable form was a light one, in which all the usual darker markings were so much suppressed as to be only just traceable. At the other extreme were a few specimens having the usual dark markings much intensified in colour and somewhat extended in area. Another specimen was very light and uniform in coloration, with a conspicuously dark orbicular on forewings and unusually dark marginal bands on hind wings.

Mr. Robson exhibited a variety of *Smerinthus tilia*, L., without any trace of the usual dark band across the forewings. It was bred from a dug pupa, and the larva may therefore have fed up under normal conditions. It was

noted as being large in size and fully developed. He also exhibited a very beautiful variation of *Zonosoma pendularia*, Clerck, which he had bred from a larva casually picked up last autumn.

Mr. Dennis exhibited a bred series of *Cosmia affinis*, L., from Horsley, which varied much in the size of the white costal spots.

Mr. R. Adkin brought a short series of a *Eupithecia* from Sutherlandshire, captured some two years ago in the neighbourhood of juniper bushes. He asked members to what species they were referable, as hitherto he had been unable to determine the question.

Mr. Hy. J. Turner exhibited a series of varieties of *Lycæna ægon*, Schiff., taken during the Society's visit to Oxshott on June 29th. (1) Male, underside with large spots. (2) Male, underside with elongated spots on the fore wings. (3) Male, underside with the two large costal spots on the hind wing united into a streak. (4) Female, underside with the white blotches interior to the submarginal red band intensified and developed on the fore wing. Also (5) female, underside with the two large costal spots on the hind wing united into a streak, and also the second spot from the anal angle united to one of the interior spots. (6) Female, upper side having the lower wings streaked with blue between the veins. (7) Female, upper side closely approaching *L. minima*, Fues., in size and appearance. (8) Female, upper side indistinguishable from *L. astrarche*, Bgstr., from having the red blotches well developed on all the four wings.

Mr. West, of Greenwich, exhibited a specimen of the remarkable large red fruit of the Macartney rose (*Rosa bracteata*), a native of China.

Mr. Dennis recorded his experience that the larvæ of *Lycæna argiolus*, L., fed indiscriminately upon holly leaves and flowers, as well as on ivy leaves.

Mr. Mansbridge stated that he had had a number of larvæ of *Calocampa exoleta*, L., and was much interested in watching the peristaltic movements of the internal organs through the very transparent skin. He readily noticed in the dorsal region an expansion of the blood-vessel which one might call the heart. The constrictions of this vessel commenced at the posterior end. The ramifications of the tracheal system were readily seen, as the cartilage of which the tubes were formed glistened.

AUGUST 8th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. T. W. Hall exhibited specimens of *Hadena oleracea*, L., in which both the reniform and orbicular stigmata were scarcely to be traced. He stated that this species was generally invariable, and that all our Southern specimens were of a dark reddish fuscous with the orbicular very strongly outlined with white, sometimes even forming a white spot. The reniform was usually orange, but sometimes yellow tinted. The hind wings of the male varied in tint, and were sometimes pale at the base. The hind wings of the female were always darker than those of the male. Mr. Turner referred to a variety he had bred, having the white streaks forming the **W** character much wider and longer, and forming a very conspicuous mark.

Mr. R. Adkin exhibited a series of *Eupithecia tenuiata*, Hb., which varied from the usual type in being somewhat strongly marked. They were bred from sallow catkins in the neighbourhood of Castle Bellingham, Ireland.

Mr. Perks exhibited a species of apple snail from South America, belonging to the genus *Ampullaria*.

Mr. South exhibited a box containing representative series of the species he had taken near Macclesfield during the present season. He stated that the year was an exceedingly bad one, entomologically speaking, almost as barren in results as last year. As to the cause, he was unable to say except that it had been both wet and cold. He had taken *Xylophasia rurea*, Fb., in some numbers, and four distinct forms. *Apamea gemina*, Hb., was remarkably uniform. A considerable number of *Hadena thalassina*, Rott., were bred from a batch of ova found on sallow. *H. adusta*, Esp., was peculiarly dark.

*Noctua augur*, Fb., showed a considerable amount of variation in the ground colour. *X. monoglypha*, Hufn., was the commonest insect at sugar; every form, except the very dark one, was represented. *Miana strigilis*, Clerk., were all dusky, not a single light form being taken, but still very few were comparable to the black variety *æthiops*, so common around London. *M. fasciuncula*, Haw., showed nearly every form usually obtained in England. Specimens of *Saturnia pavonia*, L., seemed more vinous in colour than those from the South. *Hepialus velleda*, Hb., he had found in two localities, one a low-lying moss, and the other the neighbour-

hood of a pool some 200 feet higher up; the specimens obtained at the higher elevation were larger and brighter than those from the moss. In both localities the var. *carnus*, St., was in the proportion of about one in twelve. Of *Acronycta menyanthidis*, View., many larvæ were obtained, but only some half-a-dozen moths had emerged. *A. megacephala*, Fb., were darker than the usual type. As a result of his observations so far he should say that melanism was by no means of common occurrence around Macclesfield. He had taken one perfectly black female of *Phigalia pedaria*, Fb., and had bred an example of *Amphidasys betularia*, var. *double-dayaria*, Mill.; each of these was the only specimen of the species he had seen in the district. Most of the *Apamea didyma*, Esp., he had seen were of the unicolorous grey-brown form, only one was black, but there were several of the *ophiogramma*-like form.

Mr. A. E. Hall exhibited a specimen of *Argynnis adippe*, L., referable to var. *cleodoxa*, Och.; a pale female of *Hepialus humuli*, L.; and a striking variety of *Triphæna comes*, Hb., having the usually dark markings, especially the two transverse zigzag lines, of an intense black.

Mr. H. Moore exhibited a specimen of *Epinephele ianira*, L., with a considerable increase of the fulvous area similar to the South European form; also an Orthopteron from South Africa of the genus *Petasia*; and a quantity of the black or Spanish moss (*Tillandsia usneoides*). The latter belonged to the order Bromeliaceæ, from St. Augustine, Florida, U.S.A. It was an epiphyte, and when stripped of its cuticle was often called vegetable horsehair. No doubt it could be propagated in an orchid house with sufficient heat and humidity.

Mr. Frohawk exhibited a long series of undersides of *Epinephele hyperanthus*, L., showing the extremes of variation, with all intermediate gradations from the var. *arete*, Mull., to the finest form of the var. *lanceolata*, of which seven specimens were shown. The variation of the ground-colour was also very great. The majority of the specimens were bred from New Forest parents.

Mr. Step exhibited a specimen of the squat lobster (*Galathea squamifera*) from Portscatho, which lived under stones and was very pugnacious; a photograph of the large spider crab (*Maia squinado*), which was remarkable for covering its carapace with all kinds of marine plants and animals, such as sponges, corallines, anemones, zoophytes, seaweed, *Serpulæ*, acorns, &c., as a means of protection; also a sketch of



the boar-fish (*Capros ater*), a native of the Mediterranean, and which had recently been captured near Portscatho. He said that the latter was a most beautiful fish, having scales of a warm orange tint, and at the same time hairy, thus giving a silvery look to it.

Mr. Turner exhibited specimens of the following species:—*Eubolia plumbaria*, Fb., a variety having the dark colour of the transverse lines suffused over a portion of the intervening space; *Zonosoma linearia*, Hb., a variety with the first and third lines almost obliterated; *Phycis fusca*, Haw., from Plumstead; *Perinephele lancealis*, Schiff., from Ramnor; *Hepialus lupulinus*, L., a snowy white variety from Brockley; *Euchelia jacobææ*, L., a variety having a small additional spot above the blotch at the anal angle of the fore-wings; *Epichnopteryx pulla*, Esp., from Loughton; *Macaria notata*, L., from Plumstead; *Diurnea fagella*, Fb., a dark female taken at Croydon, with many others, by the aid of a lantern; *Bapta bimaculata*, Fb., from Plumstead; and *Talæporia pseudo-bombycella*, Hb. males, females, and cases, from Lee.

AUGUST 22nd, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. South exhibited two specimens of a smoky variety of *Rumia luteolata*, L., from Macclesfield, taken this year along with a considerable number of the type form; also a series of *Hypermeceia cruciana*, L., and specimens of *Tortrix cinnamomeana*, Tr., *Eupithecia venosata*, Fb., and *E. pulchellata*, St., all from the same locality. Mr. Hall remarked that he possessed a pair of the same form of *R. luteolata*, which had been taken by Mr. McGregor in Scotland some years ago.

Mr. Moore exhibited series of the following Arachnidæ from St. Augustine's, Florida, viz. *Nephila clavipes*, *Atreus americanus*, and *Gasteracantha cancriformis*.

Mr. West, of Greenwich, exhibited three specimens of *Chrysomela gættigensis*, L., taken this year, one at Bookham and the other two at Box Hill, and remarked that they were the first examples he had ever taken, although he had collected many years.

Mr. Turner exhibited two specimens of *Scodiona belgiaria*, Hb., from Oxshott and Shirley, and stated that several other specimens had been taken this year at both localities. He remarked that he was pleased to find the species was still obtainable in its old locality, Shirley.

A discussion ensued as to the occurrence of *Colias edusa*,

Fb., this season. Mr. Hall had captured four at Box Hill. Mr. West, of Streatham, had seen twenty or thirty at Selsea Bill, and understood that var. *helice* had been taken in the Isle of Wight. Mr. Frohawk reported some twenty specimens from Salisbury, and Mr. Turner had taken a couple of males on Reigate Hill.

Mr. Barrett thought that sugar as an attraction for moths was profitable now, and said that *Noctua depuncta*, L., had been reported, and that *Orthosia suspecta*, Hb., was exceedingly abundant in the north of England. Mr. South said that in the Macclesfield district, sugar had been of no use whatever during the early summer months of the present year.

SEPTEMBER 12th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Jäger exhibited a very dark specimen of *Agrotis vestigialis*, Hufn. (*valligera*, Hb.), taken in North Wales. The hind wings were remarked as sharing in the melanism equally with the fore-wings.

Mr. Fremlin exhibited a beautiful series of *Polia chi*, L., var. *olivacea*, St., received from Mr. Arkle of Chester; a bred series of *Phorodesma smaragdaria*, Fb., from Essex; and a bred specimen of *Prionus coriarius*, L., from a larva found in Surrey.

Mr. Tutt exhibited a number of cases of a large species of *Psyche*, sent to him from the Argentine Republic. They were formed of a dense felt-like internal layer, surrounded by small lengths of stems placed in all positions, these being covered externally by a thin tough covering. Many of the cases when opened contained ova, from which in a very short space of time the young larvæ hatched and spread in all directions, devouring apparently a very large number of substances, and forming small papery cases. Quite recently, he stated, Professor Smith, of New Jersey, U.S.A., had written the life-history of *Thyridopteryx ephemeraformis*, Haw., a species very similar if not identical with this, which had done a vast amount of damage in America. The female was vermicular, and never left the case. It was able to turn in the cocoon to allow pairing to take place, the body of the male being very extensile. The eggs were laid in the cocoon, and it was considered that the first meal of the young larva was the remains of its mother. The cases of the males were considerably smaller than those of the females.

Mr. R. Adkin exhibited a series of *Dianthæcia nana*, Rott., and *D. capsincola*, Hb., bred from larvæ taken in North Devon, and called attention to the former species, which he considered exhibited some peculiarities, one specimen having a faint rosy tinge.

He also exhibited on behalf of Mr. H. Murray of Carnforth a specimen of *Bombyx quercus*, L., var. *callunæ*, Palmer, in which the outer half of each wing appeared to be devoid of scales, and consequently transparent; but the fringes were of the usual brownish colour, and showed in strong contrast to the borders of the wings. The specimen, a rather undersized female, was seen to emerge from pupa, and the peculiarity was noticeable before the wings expanded.

Mr. Adkin further exhibited specimens of the everlasting pea (*Lathyrus sylvestris*, L.), in both flower and seed, from Willow Wood, Eythorne, Kent, where it was found growing in some profusion along a hedge, for a distance of about fifty yards, by the roadside.

Mr. T. W. Hall exhibited a male specimen of *Lycæna bellargus*, Rott., taken some time ago at Folkestone, in which the underside of the left secondary was destitute of spots, and the white of the submargin was much suffused towards the base of the wing. It was an individual of the first brood.

Mr. Tutt read a paper on the "Variation of *Erebia æthiops*" (p. 77).

Mr. Carrington said that while collecting shells on the South Downs he had found a considerable area of the local plant *Silene nutans*, L., eaten by some species of *Dianthæcia*, and suggested it might be *D. albinacula*, Bork.

Mr. Tutt said that he had taken a considerable number of *Zygæna exulans*, Hoch., in the Southern Alps this year, some of them being very bright metallic green and typically Swiss, while some were semidiaphanous and an approach to the Scotch form. Each valley seemed to have a local race of the species.

Mr. Enock exhibited under the microscope an egg parasite in the act of piercing and ovipositing in a lepidopterous ovum. The species was *Trichogramma evanescens*, and was  $\frac{1}{2}$  mm. long, many specimens emerging from the egg of an ordinary Noctua. The females were winged, while the males were apterous. He had for some time had them under observation, and now possessed the seventh brood in succession. The cycle of metamorphosis took place in about a fortnight. He had cut out the egg immediately after it

was laid, and had observed it grow one minute after deposition. In about twenty-three hours the larva literally jumps from the shell. The process of boring was apparently very difficult to the female, for she took about nineteen minutes to pierce the shell of an egg. He had made some 180 drawings of the creature and its habits, and thought that if his observations were properly followed up, results of very great economic value could be obtained.

SEPTEMBER 26th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

The President referred to the loss the Society had just sustained by the death of Mr. W. H. Tugwell, a past president and a most devoted member of the Society, and suggested that the meeting adopt a resolution of condolence with Mrs. Tugwell.

Mr. Adkin proposed that this be done, and said that all through his long suffering he had always had the welfare of the Society in his mind, and was ever willing to render assistance in promoting its interest.

Mr. Tutt, in seconding, said that he was with Mr. Tugwell less than a week before his decease, and agreed with the President that the Society had sustained a great loss.

Mr. Robert Adkin exhibited specimens of *Spilosoma menthastri*, Esp., from Morayshire, in some of which the ground-colour of the fore-wings was rich dark brown and in others a pale wainscot.

Also a specimen of *Carpocapsa pomonella*, L., bred from a larva found feeding in a walnut at Lewisham; and read the following note:—"Mr. T. D. A. Cockerell, in a letter addressed to this Society ("Proc.," 1888-9, pp. 137-8), appeared to throw doubt upon a record of this species having been bred from a larva found in a walnut. The note in question is one by Mr. C. G. Barrett ("E.M.M.," xi., 13) who quotes from the "Zoological Record" a statement by M. Laboulbène that the species attacks nuts and that Mr. West, of Greenwich, had reared the perfect insect from a larva found feeding in a walnut. At a subsequent meeting of this Society Mr. West exhibited the specimen referred to, and thus removed all doubt as to its being referable to this species ('Proc.,' 1888-9, p. 141). So far as I am aware, however, this is a solitary record, and I am therefore glad to have the opportunity of confirming it under the following



circumstances. In the autumn of last year I found that among some walnuts served for the table were a few that contained larvæ, and some two or three of them that were not hopelessly crushed I put aside to see what would become of them, and was this spring rewarded by rearing the specimen now exhibited."

Mr. West (Greenwich) said that he had also bred *C. pomonella* from chestnuts picked up in Greenwich Park.

Mr. South exhibited a short series of *Xanthia fulvago*, L., representative of a large number of the species bred this year from catkins obtained in the neighbourhood of Macclesfield. One of the specimens was of the *flavago* colour, and two were var. *flavescens*, Esp. He stated that the first form was exceedingly rare and the latter very uncommon. The larvæ were chiefly fed on apple. Mr. Tutt said that the form *flavescens* was seldom obtained from the South of England. Mr. Turner stated that until this year he had never been able to obtain the species in any number, and had not bred a single *flavescens*. During the month of August this year, however, no less than nine var. *flavescens*, and about twenty of the yellow form, had appeared in his cages from larvæ taken in Surrey. Mr. Carrington said that years ago he had bred these forms in considerable numbers from Askham Bog, *flavescens* forming almost 50 per cent. Mr. Mansbridge said that his experience of this species near York was that the specimens were mostly typical and variation rare.

A discussion then ensued with reference to the fluctuation in number of various forms and varieties in the same localities. Mr. Carrington had frequently noticed instances among the Lepidoptera, but recently cases had come prominently before him in the order Mollusca. He instanced the forms of *Helix hortensis* and *Helix nemoralis* as affording pink and yellow years when one of these forms predominated. This year was undoubtedly a yellow year. Mr. Tutt agreed that there were these fluctuations, and said that they were probably caused by modifications of the environments. All insects were peculiarly susceptible to variations in their surroundings, even though these were very slight.

Mr. Oldham exhibited a series of *Lycæna bellargus*, Rott., taken this year at Folkestone, some of the females being marked with blue.

Mr. J. W. Tutt exhibited, on behalf of Mr. Massey, a series of *Lycæna ægon*, Schiff., from Westmoreland. These were remarkable for the fact that the males were partly of

the normal *ægon* tint, the remainder bluer and of the ordinary tint of *L. argus*, W.V. The females much suffused with blue, and almost identical with specimens of *L. ægon*, var. *corsica*, which Mr. Tutt had received from Mr. Nicholson, of Lewes.

A series of *Hydræcia lucens* from the mosses near Warrington, Mr. Tutt pointing out how these specimens supported his statement in "British Noctuæ and their Varieties" that *lucens* was now perfectly distinct from *nictitans*, and entitled to at least sub-specific rank. This series consisted of ninety specimens, and comprised the various named forms of the insect; vars. *grisea*, *rufa*, and the type, with their respective sub-varieties being well represented.

Interesting, as bearing on the last exhibit, was a series of the allied *Hydræcia paludis* and its varieties *intermedia*, *brunnea* and *grisea*. These were also taken near Warrington, but in a direction opposite to that in which *lucens* occurred. The captor, Mr. T. Acton, had informed Mr. Tutt that although parallel variation exists in the two forms they never overlap.

A long series of *Dyschorista (Orthosia) suspecta*, also from Warrington, including vars *congener*, Hb., *rufa*, Tutt, *variegata*, Tutt, *nigrescens*, Tutt, and *iners*, Dup. It was observed that the forms centred around var. *rufa*, and that there was not a typical specimen among them. A short series of *Celæna harworthii* comprised two forms, viz. exceedingly well marked examples of the red-brown var. *hibernica*, St., and a purple form which Mr. Tutt stated is not far from the black-brown form known as var. *morio*, Ev., except for the difference in tint.

Mr. Turner said that he had taken *L. ægon* in various other localities, but had never seen any approaching the beauty of the Westmoreland females exhibited. The southern females were almost uniformly brown. Mr. Tutt said that in the Tyrol the females of both *L. ægon* and *L. argus* were usually brown, although blue races occurred.

Mr. Carrington exhibited the flowers of the wild Canadian wallflower, which had been grown in Mr. C. A. Briggs' garden at Leatherhead, from seed picked at the head of Lake Superior.

Mr. Turner exhibited specimens of *Calopteryx virgo*, L., from Horsham; also male and female specimens of *Cherocampa celerio*, L., from an old collection made in the neighbourhood of Sheffield about 1860 to 1870; and a specimen of *Lycæna icarus*, Rott., from Clandon, having the sub-

marginal row of spots on the undersides of the fore-wings prolonged into dashes.

OCTOBER 10th, 1895.

T. W. Hall, Esq., F.E.S., *President*, in the Chair.

Mr. Hy. Tunaley, F.E.S., of Brixton Hill, was elected a member.

Mr. McArthur exhibited a number of Lepidoptera taken this year in the Orkneys, including a series of *Thera juniperata*, L., showing great contrast between the dark markings and the ground colour; the former being much intensified and somewhat extended, while the latter was considerably lighter than in South of England specimens; most of the examples had a very dark basal blotch on the fore-wings, the central band was generally very dark and broad, the edges being but little indented. *Melanippe montanata*, Bork., two specimens almost devoid of markings, those present being exceedingly faint. *Nemeophila plantaginis*, L., three specimens, one having very deep-red hind wings, another yellowish red hind wings, while the third was intermediate. *Epunda lutulenta*, Bork., with vars. *sedii*, Gn., and *luneburgensis*, Frr.

Mr. Winkley exhibited, on behalf of Mr. Montgomery, of Ealing, specimens of a second brood of *Argynnis selene*, Schiff., taken in Abbott's Wood on August 12th, 14th, and 16th. The first brood was very common, and in bad condition on June 11th, but nearly all had disappeared by the 20th; also a very beautiful female variety of *Lycæna adonis*, Fb., taken near Eastbourne on September 5th, 1895. The underside was much powdered with white scales, the base of all the wings being very blue. The wings had only the submarginal row of spots and the discoidal present, except a few scales here and there, remnants of the obliterated markings. The black was much intensified, and some of the spots were elongated.

Mr. C. Oldham exhibited a long series of *Odonestis potatoria*, L., bred in 1895. Larvæ from Cambridge. Three of the males were of the female colour. *Colias edusa*, Fb., *Leucania albipuncta*, Fb., *Phlogophora meticulosa*, L., var. suffused with red, all from Folkestone, September, 1895; and black forms of *Xylophasia polyodon*, L., from Woodford, 1894-95. Several of the males of *Odonestis potatoria* were noted as being parti-coloured, while one specimen had black markings along the base of the costa.

*I have seen  
this species  
in the H.B.  
Cap. x. It  
is nothing  
like the  
description  
of the*

Mr. R. Adkin exhibited a very beautiful series of *Noctua depuncta*, L., from Morayshire.

Mr. Hy. J. Turner exhibited a bred series of *Xanthia fulvago*, L., from Surrey, including var. *flavescens*, Esp., with almost all the usual forms of the species. The deep yellow *flavago*-form was noted as being unusual in the South of England. A specimen of the same form taken at Chattenden was also shown. It was remarked that the var. *flavescens* showed the markings, but very faintly, while in specimens from the North of England they were entirely obliterated. Mr. Turner also exhibited a short series of *Epinephele hyperanthus*, L., from Chattenden, including two var. *arete*, Müll., and a var. intermediate between it and the type, together with specimens of *Silpha quadripunctata*, L., from the New Forest, and its dark variety from Chattenden, and a specimen of *Crioceris merdigera*, F., from the same locality.

OCTOBER 24<sup>th</sup>, 1895.

T. W. Hall, Esq., *President*, in the Chair.

Colonel Partridge, of Hampstead, was elected a member.

Mr. Frohawk exhibited two specimens of *Acherontia atropos*, L., one of which had been sent to him from Glamorganshire, having been washed ashore in the breakers; the other had been captured at the lighthouse of St. Agnes, Scilly. In spite of the rough treatment they had undergone, both were in very good condition. Mr. Hall said the species had been commoner than usual this year, several having been captured around London.

Mr. Oldham exhibited a short series of *Mamestra brassicae*, L., from Wisbeach, and a series of the same species from Woodford for comparison. Those from the latter locality were considerably darker. Also two specimens of *Cosmia paleacea*, Esp., from Lancashire, with *Xylina semibrunnea*, Haw., and *Scopula ferrugalis*, Hb., from Folkestone.

Mr. H. Williams exhibited the feet of a cat, having an abnormal number of claws. The fore-feet had each seven claws, and the hind-feet six on each. Mr. Frohawk said that this was not unusual, and that a friend of his had two or three cats with six claws on each foot. Mr. Carrington mentioned that there was a farm near Berkhamsted where, for the last ten years, had existed a race of cats with an abnormal number of claws. He had seen specimens with six, seven, or eight claws on each foot, and had been told that one existed with as many as ten claws on each foot; in



fact, each claw was duplicated. It was noted that in the specimen exhibited the abnormality was not merely a division of the ordinary claw, but an actual duplication of the toe, making the foot proportionally broader.

Mr. Carrington exhibited, on behalf of Mr. West, of Greenwich, *Helix lombei*, from the Solomon Islands, *H. monicandi*, from the Philippines, and *H. erronea*, from Ceylon. Also on behalf of Mr. McArthur, a series of *H. arbustorum*, and *H. hortensis*, Müll., from the Orkneys; the specimens of the former were much thinner and darker than South of England forms, and the latter were both smaller and darker. In exhibiting these specimens he wished to urge members to collect Mollusca on days which turn out blank to each in his own particular hobby. It was exceedingly interesting to collect them as a study in variation. The species *H. hortensis* and *H. nemoralis* had as many as 180 possible variations of the bands, many of which he himself had found during the last two or three years. He then described at some length his method of killing, cleaning, and mounting specimens for preservation.

Mr. McArthur exhibited a beautiful series of *Noctua festiva*, Hb., var. *conflua*, Tr., and specimens of *Agrotis vestigialis*, Hufn., *A. cursoria*, Bork., and *A. tritici*, L., all from the Orkneys this year. The last three had not been recorded before from this locality. The *N. festiva* were not so uniform as the Shetland *N. conflua*, but the extent of variation was from the Southern form to the Shetland form.

Mr. Hy. J. Turner exhibited a series of *Agrotis obelisca*, Hb., received from Freshwater from Mr. Hodges, and said that he understood the species had been abundant this year. Some of the forms were dark, others were slightly ferruginous, and one or two were lighter in ground colour with an absence of the transverse lines. He also exhibited a series of *Aporophyla australis*, Bdv., from Freshwater and Deal. The Deal specimens seemed slightly yellow, while the Freshwater ones were more silvery. The fore-wings of one male were quite as dark as the usual coloration of the female.

Mr. R. Adkin exhibited two series of *Himera pennaria*, L., from the New Forest and Abbott's Wood respectively, and communicated the following note:—

“In the autumn of 1893 I received a batch of ova of *Himera pennaria*, L., laid by a moth taken in Abbott's Wood, and shortly afterwards I had sent to me the topmost twig of a holly tree that had been felled in the New Forest, on

which was deposited a number of eggs that in appearance closely resembled those known to be *pennaria*, but the position in which they were deposited appeared to be such an unlikely one that I determined to rear both lots. From the larvæ it was soon evident that both batches were alike, and the series exhibited to-night are a fair representation of the resultant imagines. On comparing the one with the other it will be seen that there is a considerable amount of variation. The prevailing character of the males from Abbott's Wood is a blackish clouding of the primaries in longitudinal patches, while in the lighter specimens the usual transverse markings are only faintly indicated, and the females are fairly uniform in ground colour. In the New Forest series there are only very slight indications of any black clouding, and in the lighter specimens, some of which have quite a bright yellow ground colour, the usual transverse markings are strongly produced; the females also show considerable variation in depth of ground colour, some being pale greyish yellow while others are of a reddish-brown, the transverse lines showing in strong relief. The differences between the two series are, however, such as would lead to the supposition that the variation is the result of heredity rather than that the insect is in either case assuming a local form, but in the absence of the parent moths no definite opinion on this point is possible."

Mr. Adkin read the following note on *Arctia caia*, L., from Mr. Thornhill:—

"Series of 27 bred from larvæ found in this district; fed on dead-nettle and lettuce; 12 males, 15 females. Killed in cyanide bottle.

*Black Margin to Hind Wing.*

- 1 ♂ a dark one, black margin all round.
- 2 ♀ black margin in patches all round.
- 8 (4 ♂, 4 ♀) black margin on outer angle, marked (1) in diagram.
- 16 no sign of black margin.

---

27

*White Margin to Upper Wing.*

- 3 ♀'s have a white margin in patches all round.
- 24 no appearance of white.

---

27

*Dark Insects.*

4 (1 ♂ 3 ♀) have an abnormal amount of black markings, and the red of underwing a much darker red.

*Light Insects.*

3 (2 ♂, 1 ♀) have a subnormal amount of black markings, and underwings a paler red.

*Orange Hind Wing.*

2 ♂'s distinctly orange.

*The Black Markings on Hind Wings.*—As per enclosed sketch. I have called the markings normal when seven spots, and in about the position placed. I have numbered them from 1 to 7, and I find—

9 as per sketch.

4 " " but 1 and 2 joined.

4 marks 5 and 6 joined into a band and 1 and 2 joined.

3 with 1 and 2 joined and minus 5.

1 minus 5, 6, and 7, as No. 8 in sketch.

1 " 5 and 6, and 1 and 2 joined.

1 " 7.

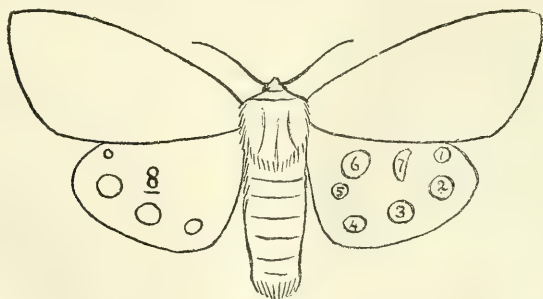
3 " 7 and 5.

1 " 5.

—

27

No two of the 27 insects are marked exactly the same."



Mr. West, of Greenwich, exhibited the bug *Zicrona cærulea* L., taken by Mr. Billups on the fungi exhibited at St. Martin's Hall.

Mr. Stanley Edwards read a paper communicated by Mr. Step, entitled "Notes on Sea-anemones" (printed in full on page 87).

Mr. Turner laid on the table the Report of the Annual Exhibition, compiled by himself (printed in full pp. 64—76).

Mr. Carrington reported that on Sunday, October 20th, he saw between Brighton and Shoreham several quite freshly emerged *Colias edusa*, Fb., and Mr. Frohawk said that on the same day he saw a considerable number at Havant.

NOVEMBER 14th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Griffith, of Clifton, Bristol, was elected a member.

Mr. C. A. Briggs exhibited a living specimen of the Madeira cockroach, *Panchlora madeiræ*, Fab., which had been captured in Covent Garden Market, and doubtless imported with bananas.

Mr. Edwards exhibited specimens of *Morpho cacia* and *Morpho neoptolemus* from Peru.

Mr. R. Adkin exhibited a series of *Emmelesia tæniata*, St., from Co. Kerry, Ireland. The specimens were somewhat lighter in appearance than the North English form.

Also a specimen of *Arctia caia*, L., from Co. Louth, Ireland, in which the brown markings of the fore-wings were of a much darker shade than any of the English examples that were exhibited beside it for comparison.

Colonel Partridge said that he had taken numbers of *E. tæniata* in Ireland, but that he had seldom obtained specimens in good condition.

Mr. Williams exhibited a short bred series of *Oporabia dilutata*, Bork., two specimens being very dark and uniform in coloration, another having a dark transverse band with white marginal areas.

Mr. McArthur exhibited living larvæ and a recently emerged imago of *Triphana comes*, Hb. (*orbona*, Fb.), from the Orkneys. It was remarked that the imago was of the form *curtisii*, Newm., being small, very dark, and with but little red colour. Mr. McArthur said that specimens captured in the Orkneys were all of the *curtisii* form.

Mr. Turner exhibited a specimen of *Phorodesma smaragdaria*, Fb., which was unique in having been bred on September 26th from a larva taken at the end of August. Also several specimens of *Vanessa urticae*, L., including one of about half the usual size in expanse of wings, one rather small and dark from Keswick, and one having



the two central spots of the fore-wings reduced to minute dots.

Mr. Mansbridge exhibited a series of *Hyphenodes albistrigalis*, Haw., taken at sugar in Epping Forest during July.

Mr. Sturt exhibited a living larva of *Sphinx convolvuli*, L., one of a number which he had received from Cornwall, the others having all gone to earth; also drawings of the different forms which had occurred in the brood. He stated that he had hoped to have exhibited a pupa, but that larvæ which had been down in earth more than three weeks had not yet pupated. Mr. Barrett noted that one of the drawings was of a green coloured larva with stripes, and said such a form, although it sometimes occurred, was most unusual. It was considered doubtful whether the imagines would emerge naturally, and the general advice was that the pupæ should be forced. Mr. Adkin said that *S. convolvuli* was a native of a hotter climate, and that its larvæ in England would not develop at a sufficiently rapid rate to pupate before the approach of winter. Mr. Carrington referred to the York collectors of years ago who were very successful in rearing *A. atropos*, and who invariably forced their pupæ. He described their method of procedure, and said that they always looked for the emergences to take place six weeks after the commencement of forcing. Mr. Tutt said that *S. convolvuli* was a species which had the migrating instinct, but was not capable of easily adapting itself to the new conditions imposed upon it by an English climate. The temperature of its habitat had a much higher average. Its two appearances were in May and August, from the first of which immigrants came over to England. The brood succeeding these would be later, say September, and thus we get late larvæ such as the one exhibited, which would undoubtedly have succumbed in the open, from the uncongenial nature of the climate. Mr. South suggested that perhaps autumnal emergence might ensue from larvæ which had pupated near the surface, while those larvæ which had gone deeper would not attain the imago state until the following spring or early summer.

Mr. South exhibited a short series of *Acronycta menyanthidis*, View., which he had bred from larvæ found on the moors at Macclesfield. Although the larvæ of this species is stated to feed on many low plants, he had only found them on sallow and birch, chiefly on the former, which they also preferred in confinement.

Mr. Carrington exhibited the following series of various

forms of *Helix nemoralis*, L., from different localities :—Two specimens of mons. *sinistrorsa*, Colb., from Bundoran, co. Donegal, Ireland, var. *albolabiata*, Von Mart., Arran Isles, co. Galway, forms which although occurring in *H. hortensis*, were very rare in *H. nemoralis*; var. *major*, Fér., from the South Downs, near Falmer; numerous examples of (12)345, from various localities; and a number of sub-fossil forms from Dog's Bay, Galway. The latter were a very interesting exhibit, and it was stated that they were only found in a very restricted locality on the West Coast of Ireland, consisting of a series of sands on which were here and there mounds or kitchen middens, containing palæolithic implements. The specimens shown were much thicker than recent forms, and had evidently undergone a certain amount of calcification, although several specimens showed bands.

Mr. Ashdown exhibited a series of specimens of Lepidoptera from Leatherhead, including an interesting variety of *Melanippe sociata*, Bork., having the transverse narrow white band which starts from the costa on the right fore-wing bent round the discoidal spot to meet the costa again, forming a most unusual and remarkable aberration of the customary markings.

Mr. Step communicated a list of British Stalked-eyed Crustacea, including all the recently-discovered species, with references to the species which were described in Bell's "Crustacea" (see pp. 92—96).

NOVEMBER 28th, 1895.

T. W. HALL, Esq., *President*, in the Chair.

Mr. Chipps, of Castelnau Terrace, Barnes, S.W., was elected a member.

Mr. Robert Adkin exhibited a specimen of *Mesogona acetosellæ*, Fb., a species not previously recorded as British, which was taken at sugar by Mr. Thomas Salvage in his garden at Arlington, Sussex, on the evening of 26th October last. This specimen is figured and fully described "Entom.," xxviii., p. 317.

Mr. Adkin also exhibited a series of *Coremia munitata*, from Hoy, Orkney, with a series of the same species from Shetland and Paisley, and of *C. designata*, Hufn. (*propugnata*, Fb.), for comparison, and read the following note:

"Mr. McArthur has already exhibited some of the more striking forms of several of the species that he collected at

Hoy during the past summer, but there are many insects in the collection which, though less striking at first sight, are of very considerable interest when carefully compared with specimens from other localities. The *C. munitata* exhibited come under this category. Compared with those from the other localities they are somewhat inferior in size, some of them being no larger than *C. designata*; the ground-colour of the wings is variable sexually, that of the males closely matching the grey of the Paisley series, while the females in this respect are nearer to the brownish shade of the Shetland form. The numerous fine striæ, which are hardly discernible in the two last-mentioned series, are strongly produced (more particularly in the females), and in this respect they bear a superficial likeness to *C. designata*. They are, however, at once separable from that species by the shape of the outer margin of the central fascia, which is undoubtedly that of *C. munitata*."

Mr. Hall said that the specimens exhibited were undoubtedly very confusing. Mr. Barrett said that the two species could always be distinguished by the shape of the costa, and remarked that the Hoy specimens of *C. munitata* somewhat resembled those from Iceland, where its habit was to fly by day. Mr. Tutt said that he had found that many species, whose habit here was to fly at dusk or dark, flew during the day in Alpine regions. This particular species he had found 6000 feet above the sea in the Tyrol. Mr. Carrington had seen the same species flying between 2 a.m. and 4 a.m. on the Scotch mountains.

Mr. H. Moore exhibited a very long bred series of *Ocneria dispar*, L., with the female parent, from Bordeaux. The larvæ had been fed on hawthorn, and although well supplied with food, the imagines had all come out small in size. Mr. Carrington said that he had found the larva on hawthorn in the Riviera, but that apple and plum were its usual food.

Mr. Carrington exhibited four more or less xanthic specimens of *Epinephela ianira*, L., taken in the same field at Leigh, Essex, in 1890-91. One specimen was very pretty, being considerably mottled with white on all the wings. He also exhibited typical and lemon-coloured varieties of *Hesperia lineola*, L., from Shoeburyness.

Mr. Clark exhibited a number of large and well-developed micro-photographs of various entomological objects.

Mr. Hy. J. Turner exhibited specimens of *Noctua festiva*, Fb., from Carlisle, including a specimen of the moorland form formerly sent out by the Aberdeen collectors as *N.*

*conflua*; a specimen of *Crambus pinellus*, L., from Box Hill, and remarked that he had never taken the species but singly; a captured and a bred specimen of *Anticlea rubidata*, Fb., the latter being beautifully suffused with rosy colour much deeper than usual; also two specimens of *Coccyx cosmophorana*, Tr., taken near Carlisle. Mr. Barrett said that the last-named species was always associated with the resinous exudations caused on the pine-trees by *Retinia resinella*, L. Mr. McArthur stated that he had bred a considerable number of this species from the resinous knobs, but always in the year following the emergence of *R. resinella*. He suggested that the egg was laid while the latter species was feeding, and stated that the larvæ of *C. cosmophorana* was found among the frass of *R. resinella* and appeared to feed on it. He had so taken it at Forres, in the knobs which always occurred on the smaller young trees, but it did not to his knowledge occur at Rannoch. Mr. Carrington believed that there existed a record of its occurrence at the latter place, but thought that it had never been authenticated, and stated that it had been captured at various places where *R. resinella* was not found. Mr. Adkin had for some years carefully preserved the resinous knobs caused by *R. resinella* in expectation of breeding the species, but they had only produced *Dioryctria abietella*, Zinck. The larvæ of this species, however, fed on the wood in the neighbourhood of the knobs. Mr. Tutt believed that Lord Walsingham had recorded the species from the Eastern Counties, and that it had occurred in young plantations, suggesting its introduction with the imported trees. Mr. South remarked that, like *Tortrix piceana*, L., it might perhaps inhabit the extreme tops of the trees, and that the stragglers found may be those which the wind had dislodged.

Mr. Ashdown exhibited a specimen of *Acronycta alni*, L., bred from a larva taken at Richmond; also a specimen of *Euменes coarctata*, L., with its cocoon, which resembles that of *Eriogaster lanestris*.

Mr. Briggs exhibited *Periplaneta australasiæ*, captured some years ago in one of the plant houses in Kew Gardens by the Rev. Windsor Hambrough, and said that he believed it to be the first record from England, though it had been taken in some numbers in Belfast.

Mr. Perks exhibited a specimen of the velvety-stemmed *Agaricus volutipes*.



DECEMBER 12th, 1895.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. Searancke, L.R.C.P., of Mitcheldean, Gloucester, was elected a country member.

Mr. Barrett exhibited, on behalf of Mr. Brooks, of Rotherham, a very long bred series of *Boarmia repandata*, L., showing especially two forms, (1) the now fairly common black form, (2) a number of interesting forms with ordinary pale ground colour, but having all the dark markings much intensified; a series of grey *Tephrosia biundularia*, Bork., the only form occurring around Rotherham; and a very large number of Lepidoptera collected in the neighbourhood of Lake Tanganyika, from November, 1892, to February, 1893. Among them were the following new and only recently described species, viz.: *Pseudospiris paidiformis*, Butl., and *Sapæa trimeni*, Butl.

Mr. Mansbridge remarked that the *B. repandata* exhibited were not so intensely black as those taken in several other parts of Yorkshire, notably near Huddersfield. Of dark forms of *T. biundularia* he had known Mr. Hewitt take quite thirty specimens in a day's collecting on the Plain of York. Mr. Tunaley said that the dark form of this species was common in the neighbourhood of Birmingham. Mr. Barrett suggested that this form was especially a hill form, and noted that both the Plain of York and the neighbourhood of Birmingham were elevated.

Mr. Carpenter exhibited the following species taken in his own garden at Streatham at sallow bloom in 1895, viz.:—*Tæniocampa munda*, Esp.; *T. gothica*, L.; *S. stabilis*, View.; *T. incerta*, Hufn.; *T. pulverulenta*, Esp.; *T. gracilis*, Fb.; and *Pachnobia rubricosa*, Fb. It was noticed that the red form of *T. gracilis* was represented. Col. Partridge had taken this form in North Ireland, Mr. Hall in the New Forest, and Mr. McArthur near Dundee.

Col. Partridge exhibited an almost pure white *Cucullia absinthii*, L., which he had bred from Portland, and stated that he had reared nearly 300 but had never seen another variety.

Mr. C. G. Barrett exhibited the following remarkable varieties of Lepidoptera from the collection of Dr. Mason, of Burton-on-Trent, viz.:—*Ptilophora plumigera*, Esp., an unusually pale male and two very dark females; *Notodonta*

*trimacula*, Esp., dark females and a specimen with an unusually light band; *Cymatophora duplaris*, L., very dark uniform specimens; *Acronycta alni*, L., dark suffused male; *Agrotis segetum*, Schiff., one specimen bearing a close resemblance to *A. lunigera*, another specimen with only the smallest trace of markings and uniformly pale; *A. agathina*, Dup., very pale and very dark specimens; *A. corticea*, Hb., a unicolorous female; *A. puta*, Hb., a smoky brown female; *A. exclamationis*, L., a specimen with the stigmata connected and very sharply marked; *A. pyrophila*, W. V., an extremely pale specimen from Portland and an extremely dark one from Aberdeen; *A. lucerneae*, L., extreme dark and light specimens; *A. subgothica*, Haw., two specimens from old collections, one of which was captured by the late Mr. Raddon; *Noctua subrosea*, St., a very large male; *N. augur*, Fb., a unicolorous pale var. from Derbyshire.

Mr. Frohawk exhibited a photograph of a Bird-Cherry tree (*Prunus padus*, L.) covered with the webs of *Hyponomeuta evonymellus*, L.

Mr. Robert Adkin exhibited specimens of *Hydræcia micacea*, Esp., from co. Westmeath, Ireland, which were darker than the usual English form, one of them being similar in colour to *H. petasitis*, Dbl., an example of which was shown for comparison, but was easily distinguishable from that species by the straighter costa and narrower forewings. He also exhibited a variety of *Agrotis saucia*, Hb., from the same locality; this specimen was of small size, the colour of the primaries purplish grey, the transverse markings and stigmata outlined in black, and the secondaries of the usual pearly grey.

Mr. Hy. Tunaley exhibited *Lycæna corydon*, Fb., in which the black border of hind-wings extended within the marginal series of spots, and a specimen in which the black border was entirely absent from all the wings; both varieties from Freshwater. Also specimens of *L. bellargus*, Rott., and *L. corydon*, in which the hind-wings were angular rather than round. Another interesting exhibit was an example of the dipterone *Asilus crabroniformis*, L., with a specimen of *L. icarus*, Rott., impaled on its lancet; this was taken at Freshwater in August, 1895. He contributed the following note:—The angularity is due to a shortening of the wing from its junction with the body, and a straightening of the hind-margin. The angulated specimens were taken in an exposed, high and windy district near the coast; the rounded form more inland, lower, and sheltered. I cannot conceive of

such a general modification as the above occurring, without the insect deriving some benefit, and it is *just possible* it may be the result of the increased resistance a more ample wing area would meet with in such a windy and exposed locality. Out of a large number of *L. bellargus*, and *L. icarus* examined, I only found *one* specimen each, showing this tendency to angularity and none in *L. ægon*, *L. astrarche*, and *L. argiolus* ; but these are not so swift of flight, nor have I ever taken them in such exposed and windy localities as *L. corydon*. The angularity was entirely confined to the males, but unfortunately no special search was made at the time for females."

Mr. South exhibited specimens of adipocere of the horse and of a moth which he had received from Dr. Knaggs, and referred the members to an article by the latter gentleman on the subject in the "Entomologist," vol. xxviii., p. 76.

Mr. H. Winkley, on behalf of Mr. Montgomery, of Ealing, exhibited a very long series of *Colias edusa*, Fb., bred from ova during the autumn of the present year ; and Mr. Edwards read a paper descriptive of the exhibit and communicated by Mr. Montgomery (printed at page 83).

# THE SOCIETY'S EXHIBITION

WAS HELD AT THE

ST. MARTIN'S TOWN HALL,

ON THURSDAY, OCTOBER 17th, 1895.

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*Exhibition Committee*: Robert Adkin, F.E.S.; T. R. Bilups, F.E.S.; C. A. Briggs, F.E.S.; J. H. Carpenter; J. T. Carrington; F. E. Filer; T. W. Hall, F.E.S.; W. Mansbridge, F.E.S.; Richard South, F.E.S.

*Honorary Report Secretary*.—H. J. Turner, F.E.S., 13, Drakefield Road, Hatcham, S.E.

*Honorary General Secretary*.—Stanley Edwards, F.L.S., Kidbrook Lodge, Blackheath, S.E.

## BRITISH LEPIDOPTERA.

The President, Mr. Thomas William Hall, F.E.S., exhibited an extensive selection, comprising, among other things, a case prepared to show the life-history of *Sesia sphagi-formis*, Fb., in which were a second year's larva; the second and third years' larval workings; male and female pupæ—pupæ *in situ*, both before and after the imago had emerged; a series of alder sticks, showing the mode of working and emergence, and a fine-bred series of the imago, all from Tilgate Forest. A fine series of *Colias edusa*, Fb., containing specimens of the female with almost entire black band, and two with a light brown band; also a short series of the var. *helice*, Hb.

A short series of English *Vanessa antiopa*, L., and a fine series of *Apatura iris*, L., with the var. *iole*, Schiff., and an intermediate form.

A fine series of *Chrysophanus dispar*, Haw., and all the *Theclæ*; a series of *Lycæna semiargus*, Rott.; varieties of *L. bellargus*, Rott.; and *L. corydon*, Fb.; and a long series of *L. arion*, L., both from the Coltswood and Cornwall localities.

A long series of *Lælia cænosa*, Hb., with pupa case; also of *Ocneria dispar*, L., including the old fen form; series of



*Acherontia atropos*, L., *Sphinx convolvuli*, L., and *Deilephila galii*, Schff.

A fine series of *Senta maritima*, Tausch., and its varieties; also of *Nonagria canna*, Och., and *N. brevilinea*, Fenn., the former showing considerable colour variation.

A long series of the rare *Noctua subrosea*, St., and an extended and varied series of *N. festiva*, Hb., from many localities.

A life history of *Abraxas grossulariata*, L., with some fine varieties, showing also its parasite, *Casinarina vidua*; and its hyper-parasite, *Mesochorus fulgurans*.

Two interesting and fairly complete drawers of the Eupitheciæ and a drawer of varieties and rarities, including fine banded and blotched *Arctia caia*, L.; *Odonestis potatoaria*, L., *Melitæa athalia*, Rott., *Spilosoma lubricipeda*, L., *Polia xanthomista*, Hb., *Cleora angularia*, Th. (*viduaria*), *Leucania vitellina*, Hb., *L. albipuncta*, Fb., *Xylomiges conspicillaris*, L., *Cymatophora ocularis*, Gn., and others.

Mr. R. South, F.E.S., exhibited a small educational series of British moths, comprising male, female, and larva of each species shown. There were also a few boxes of moths, principally Tortrices, from Macclesfield.

Mr. Hamm exhibited a large number of varieties of various species taken around Reading, including a very striking diaphanous specimen of *Melitæa aurinia*, Rott.; a series of *Polyommatus phlæas*, L., one example being partly silvery white on one side, another very dark, another having a rayed margin to the hind wings, and another being very light and having only two spots on the fore-wings; a very dark insect placed under the name *Lithosia lurideola*, Zinck., but which was difficult to determine, some entomologists considering it an extraordinary variety of *L. griseola*, Hb.; an exceedingly varied and fine series of *Xanthia aurago*, Fb., showing specimens uniformly dark, with but traces of marking, to others nearly uniformly light, some of the banded forms being exceptionally striking; a series of *Sesia sphegiformis*, Fb., from Reading; males, females, and cases of the rare *Psyche opacella*, H.S., and cases of *Fumea intermediella*, Brd., of all sizes, from the earliest made by the larva on emergence from the ovum, to that in which the species changed to a pupa; with both sexes of the perfect insect.

Mr. Jäger exhibited several drawers containing, among other things, a grand series of bred and captured specimens of *Callimorpha hera*, L., including the var. *lutescens*, L., and the intermediate terra-cotta coloured form; also a beautiful

series of *Spilosoma lubricipeda*, Esp., with var. *radiata*, St., and its modifications; also var. *fasciata*, Tug., and a form in which the ground-colour was slightly smoky instead of buff.

Mr. H. W. Barker, F.E.S., exhibited a drawer of *Arctia* and another of *Lycæna adonis*, Fb., *L. ægon*, Schiff., *L. astrarche*, Bgstr., &c.; one specimen of the last-mentioned species was an example of the var. *salmacis*, St., taken in the south of England.

Mr. Alf. T. Mitchell exhibited the following species and varieties:—*Papilio machaon*, L., two winters in pupa, one a very dark form but crippled; *Anthocharis cardamines*, L., two winters in pupa, also a female with an orange splash on the left superior wing and a similar splash on the underside of the right wing, Kingston (Oxon.); *Vanessa urticæ*, L., banded forms bred at Chiswick, 1895, also a curious specimen similar to var. 3 in "Newman's Butterflies," Kingston (Oxon.); *Epinephele ianira*, L., an entirely fulvous not bleached specimen, taken at Abbott's Wood, Sussex; *Polyommatus phlæas*, L., a specimen in which the spots were large and elongate, forming a more or less complete band, Barnes, S.W., 1893; also a banded form from Malvern (Worcester); *Callimorpha hera*, L., South Devon, taken 1895; *Melanargia galatea*, L., an example with left inferior wing partially suffused, Abbot's Wood (Sussex); *Boarmia abietaria*, Hb., very large melanic form, New Forest; *Boarmia repandata*, L., dark forms, Chepstow (Mon.), 1895; *Ennomos autumnaria*, Wernb., series bred from Ramsgate parent; *Eugonia fuscantaria*, Haw., bred, very pale and lead-coloured forms, Chiswick; *Catocala sponsa*, L., bred, New Forest ova, an example with wings (inferior), similar to *C. nupta* in colouring; *Angerona prunaria*, L., forms from Chepstow and North Kent, 1895.

Mr. C. H. Williams exhibited among many others two specimens of *Abraxas grossulariata*, L., with only two small spots on the margin of the hind wings, and otherwise less spotted than is usual; an extremely varied series of *Angerona prunaria*, L.; a beautiful variety of *Cheimatobia boreata*, Hb., having a dark band and a very light ground-colour; three very fine specimens of *Oporabia dilutata*, Bork., one being uniformly mottled, another very dark, and the third yellowish in ground-colour.

Mr. J. H. Carpenter exhibited his collection of the genera *Argynnis*, *Melitæa*, and *Vanessa*, including a large number of the white spotted forms of *Argynnis paphia*, L.; a dwarf form of the same species about half the usual size; a rayed

melanic male; a variety of *McIltaea aurinia*, Rott., showing no trace of yellow; and a very beautiful specimen of the same species, having a broad band across all four wings.

Mr. Henry Tunaley, F.E.S., exhibited a case of *Lobophora viretata*, Hb., showing the protective resemblance of the insect to its resting place, the green form to the bark, and the yellow form to the withered leaves of the holly.

Mr. Henry J. Turner, F.E.S., exhibited two cases representing the species, seventy-four in number, taken in a small garden near Nunhead Station.

Mr. McArthur exhibited a case of British butterflies.

Mr. H. A. Auld exhibited, among other things, a series of *Callimorpha hera*, L., one of which was captured by himself and the rest bred; among them were examples of the var. *lutescens*, L.; a fine series of *Nola albulalis*, Hb.; an almost white specimen of *Lomaspilis marginata*, L.; and two very large specimens of *Ocneria dispar*, L.

Mr. J. A. Clark., F.E.S., exhibited, among other species and varieties, a fine series of the now extinct *Lalia canosa*, Hb.; a specimen of *Bombyx rubi*, L., from Wicken Fen, with scarcely a trace of the transverse line; several specimens of lavender-coloured *Demas coryli*, L.; some very varied *Abraxas grossulariata*, L., including a remarkable one with a broad white band, while the rest of the ground-colour was uniformly black; an unusually smoky var. of *Abraxas sylvata*, Scop.; several *Lomaspilis marginata*, L., with but few traces of markings, and another having the ground-colour slightly buff; a very striking var. of *Oporabia dilutata*, Bork., having a dark band and an unusually light ground; a uniformly black var. of *Larentia cæsiata*, Lang; and a very dark, uniformly fuscous *Hybernia defoliaria*, Clerck.

Mr. C. G. Barrett, F.L.S., exhibited his long and varied series of *Zygænidæ*, *Nolidæ*, *Psychidæ*, *Xanthia*, *Amphidasydæ*, and *Boarmiidæ*; among which were to be specially noticed the fine series of *Nola albulalis*, Hb.; his series of *Amphidasys betularia*, L., including var. *doubledayaria*, Mill., and some very fine intermediate forms; a curious fuscous specimen of *Biston hirtaria*, Clerck.; long and very fine series of *Tephrosia biundularia*, Bork., and var. *crepuscularia*, Hb.; series of nearly the whole of the British *Psychidæ*; and some very fine *Xanthia aurago*, Fb.

Mr. J. W. Tutt, F.E.S., exhibited his unrivalled series of *Agrotis tritici*, L., and its varieties, which occupied four drawers; and a drawer of very fine vars. of *Cidaria immanata*, Haw., captured at Lochgoilhead in August, 1893.

Mr. Merrifield, F.E.S., a number of specimens in illustration of the changes in colour and markings effected by varied temperatures applied in the pupal stages.

Mr. R. Adkin, F.E.S., exhibited a collection of Lepidoptera made in Hoy, Orkney, during the present year, including *Agrotis tritici*, L., and *A. cursoria*, Bork., both not previously recorded from the island, and *Triphæna comes*, Hb., together with the Agrotids and Triphænas from his cabinet for comparison. The Hoy collection also contained, among other species, *Nemeophila plantaginis*, L., including forms with the usual yellow ground-colour of the hind wings replaced by red; variable series of *Noctua festiva*, Hb., *Epunda lutulenta*, Bork., *Hypsipetes sordidata*, Fb., and *Cidaria immanata*, Haw., and *Thera juniperata*, L., with the central fascia almost black. Also several drawers of Bombyces, the Zygænidæ including yellow and intermediate forms of *Zygæna filipendulæ*, L., and *Z. trifolii*, Esp., and the Sesiidæ with a case of cocoons of several of the species, showing their methods of pupation.

Mr. D. Chittenden exhibited the following *Noctuæ* from Ashford, Kent:—Captured *Pachetra leucophæa*, View., red and yellow forms of *Xanthia aurago*, Fb., a very variable series of *Agrotis segetum*, Schiff., dark forms of *A. cinerea*, Hb., an unusual variation of *A. exclamationis*, L., and a variety of *Cleoceris viminalis*, Fb.

Mr. Percy Bright, F.E.S., exhibited many rare and unusual varieties. The most noticeable were as follows:—A long series of *Hepialus humuli*, L., vars. from Shetland, taken by Mr. W. Reid and himself in Unst, 1895; a series of *Sesia scoliiformis*, Bork., taken at Rannoch by Mr. W. Reid; a series of fine picked vars. of *Tæniocampa gracilis*, Fb., from the New Forest; two very fine vars. of *Arctia caia*, L., one with dark brown fore-wings and black hind wings, the other very light, upper markings very small and some absent, bright orange vermilion under wings with dark spots very small or absent; a remarkable variety of *Metrocampa margaritaria*, L., with transverse markings of fore-wings converging and meeting in the centre; fine series of varieties of *Argynnis paphia*, L., from the New Forest, including the white spotted form, a gynandrous specimen, and one dark variety; series of dark varieties of *Spilosoma menthastri*, Esp., bred by Mr. W. Reid; series of *Crymodes exulis*, Lef., taken by himself in Unst, 1895; *Vanessa urtica*, Esp., vars. including one with nearly black hind wings (figured "Entom.," xxix., 73); *Limenitis sibylla*, L., black variety.



Mr. J. A. Clark, F.E.S., exhibited an instrument he had invented to aid in the setting of small insects; it consisted of an adjustable lens on a long movable arm, allowing the free use of both hands in placing the wings in position.

#### FOREIGN LEPIDOPTERA.

Mr. A. H. Jones exhibited several drawers of *Rhopalocera* from the South of Europe, including a very long and beautiful bred series of *Thais cerisyi*, God., showing much variation, among them being a very striking dark var. of the female; a fine series of *Thais polyxena*, W.V., and var. *cassandra*, Hb., bred from larvæ taken at Hyères; a series of *T. rumina*, L., and its var. *medesicaste*, O.; a series of *Euchloë belia*, F., and its var. *ausonia*, H.; a series of *E. tagis*, H., and its var. *bellezina*, Bdv., from Digne; and a fine and long series of *Leucophasia duponcheli*, Staud., and its summer form var. *æstiva*, from Digne. Very many of the specimens were bred.

Mr. McArthur exhibited a case of fine Indian Papilios.

Mr. H. J. Turner, F.E.S., a case of African Rhopalocera, including *Papilio cenea*, Stoll., *P. pylades*, Fab., *P. demoleus*, L., *P. polices*, Cram., *P. nireus*, L., *Danaïs niavius*, *D. echeria*, Stoll., *Diadema misippus*, L., and *Junonia anacardii*, L.

Mr. J. H. Leech, F.L.S., exhibited a large and very fine collection of Lepidoptera from the Palæarctic region, comprising five drawers of *Vanessidæ*, five of *Argynnidæ*, six of *Bombyces*, four of *Noctuæ*, and four of *Geometræ*. Among the selections there were several very fine varieties, and the series of many species found in Britain included examples from Japan or other parts of Eastern Asia.

Mr. Walter A. Pearce exhibited about 150 species of Heterocera from Pennsylvania and Colorado, including *Sphinges*, *Bombyces*, *Noctuæ*, and *Geometræ*, all collected by himself during his residence in the United States.

Mr. W. Mansbridge, F.E.S., exhibited many fine series of Lepidoptera from the Indian Territory, U.S.A., the result of about six months' collecting. The exhibit included seven species of the genus *Papilio*, a full series of the seasonal forms of *Colias eurytheme*, Bd., and *Phyciodes tharos*, Dru., as well as the brilliant *Anæa andria*, Scudd., which is so well protected when at rest by the resemblance of its underside to a dead leaf. The specimens were all collected by himself.

Mr. Arthur Hall exhibited three cases of Palæarctic and Nearctic *Argynnidæ*, one case of South American *Catagramminæ*, and two cases of scarce Oriental *Nymphalidæ*.

Mr. Stanley Edwards, F.L.S., exhibited his very valuable collection of Papilioninæ from all parts of the world.

Mr. O. E. Janson, F.E.S., exhibited exotic Lepidoptera, comprising a selection of the genus *Ornithoptera*, or bird's wing butterflies, and some rare and remarkable species of *Hepialidæ*, including *Zelotypia stacyi* (the giant swift moth of Australia), *Leto venus* (the silver swift of South Africa), *Charagia lewini*, etc.

#### COLEOPTERA.

Mr. W. West, of Greenwich, exhibited his collection of British Geodephaga (*Cicindelidæ*, *Carabidæ*, *Dytiscidæ*) and the genera *Chrysomela* and *Aphodius*, wanting in very few species, one monster specimen of *Lucanus cervus*, L. (Stag beetle) being very prominent.

Mr. B. G. Rye, F.E.S., exhibited educational cases showing representatives of all the families and most of the genera of British Coleoptera.

Mr. O. Janson, F.E.S., exhibited some very fine specimens of exotic Coleoptera, including a series of the three great African Goliath beetles, *G. giganteus*, *regius*, and *cacicus*, also *Hypocephalus armatus*, *Phalacrognathus mülleri*, *Mormolyce phyllodes*, and other rare or remarkable forms.

#### HYMENOPTERA, DIPTERA, HEMIPTERA, &C.

Mr. T. R. Billups, F.E.S., exhibited inimitably set and arranged, collections of British ants, bees, and wasps; a collection of bugs (Hemiptera), and a very large number of life histories of species of Diptera and Hymenoptera which are parasitical on Lepidoptera.

Mr. Alf. Beaumont, F.E.S., exhibited three drawers of British Diptera.

Mr. Carrington exhibited a number of plants having insect galls upon them.

Mr. Billups captured a specimen of the beautiful bug *Zicrona cærulea*, L., among the Fungi. It was no doubt introduced with the moss from Oxshott, Surrey.

Mr. H. A. Auld exhibited the nest of a hornet (*Vespa crabro*, L.).

#### ORTHOPTERA, &C.

Mr. C. A. Briggs exhibited a collection of British Orthoptera; living specimens of the ship Cockroach, *Periplaneta*

*americana*, L., now gradually becoming naturalised in England; and on behalf of Mr. W. J. Lucas, of Kingston-on-Thames, specimens of *Æschna juncea*, L., and *Æschna cyanea*, Mull., taken in cop. at Bournemouth, 1895.

Mr. Ashdown exhibited the local and scarce species *Gomphus vulgatissimus*, Selys., from the New Forest; a specimen of *Libellula quadrimaculata*, L., var., *prænubila*, New., and a variety of *Calopteryx virgo*, L., a male with finer neururation somewhat similar in appearance to the female from the greater suffusion of brown, and intermediate between the type and var. *anceps*, Stph.

#### GENERAL ZOOLOGY.

Mr. Charles Oldham exhibited the skin of a fox killed at Folkestone. The fox was one which had taken up its abode in the cliffs near the sea.

Mr. Mark H. Winkley exhibited a Reptilian happy family consisting of a small tortoise, a large chameleon, four ringed snakes, and a Jersey green lizard, together, in a vivarium, with ferns. A separate glass contained a number of young snakes only a few inches long, and eggs of the snake were also shown.

Mr. T. W. Hall, F.E.S., exhibited a collection of horns, and the skulls of several antelopes, the tiger, wild boar, camel, wild dog, etc., etc., mostly from India.

Mr. E. Step sent for exhibition living examples of the snake-locked anemone (*Cylista viduata*) and the dahlia wartlet (*Bumodes verrucosa*).

#### MOLLUSCA.

Mr. H. A. Sauzé exhibited, among other things,—Bivalves: the curious hammer-shell (*Malleus vulgaris*), and saddle-shell (*Placuna sella*), a handsome *Spondylus*, or thorny oyster, and the spotted clam (*Hippopus maculatus*). Univalves: several species of *Conus*, *Murex*, *Pterocera*, *Ranella*, *Cypræa*, and *Turbinella*, among which stood out the white and purple “Virgin Cone” (*Conus virgo*), and the “Chalk Shell” (*Turbinella pyrum*), from which heavy white bracelets are cut for the beauties of the East.

Mr. C. H. Dedman exhibited a considerable number of species of British shells, including a very large specimen of *Anodonta cygnea*, L.; several specimens of *Helix hortensis*, Mull., having only oo300 present, a somewhat unusual variation; and specimens of *Helix ericetorum*, Mull., which

species had been in countless numbers near Beachy Head this year, and had been much relished by the sheep feeding on the Downs.

Mr. G. K. Gude, F.Z.S., exhibited about a hundred species of shells from the Philippine Islands, belonging to the genera *Cochlostyla*, *Chloræa*, *Rhyssota*, *Hemiplecta*, *Hemitrichia*, and *Macrochlamys*.

Mr. J. T. Carrington exhibited a very fine collection of British land shells, especially collected to show the range of variation; among others may be particularly mentioned the series of *Helix pomatia*, L., *H. hortensis*, Mull., and *H. memorialis*, L.; a number of South European land shells found by himself in the Riviera; and a small collection of fresh-water shells from Lake Manitoba.

Mr. F. P. Perks exhibited living British fresh-water snails with explanatory sketches and diagrams, as well as a large living South American *Ampullaria*.

Mr. R. A. Adkins exhibited varieties of British land-shells, including *Helix virgata*, Da Cos., with unusually raised spire, and *H. cricetorum*, Müll., brown forms, from Eastbourne, *H. elegans*, from Dover, and *Cyclostoma elegans*, Müll., rosy and mottled forms from Reigate, also *Clausilia rugosa*, Drap., from Shetland.

#### CRUSTACEA.

Mr. W. Manger exhibited cases of British and Foreign Crustacea, including some very curious specimens from Weymouth, which were dredged, and not very common. *Ocypode cursor*, from West Coast of Africa, a rare thing with a pencil of stiff hairs on the end of the eye-stalks; also small Crustacea from the Red Sea, which were very curious and uncommon.

#### ORNITHOLOGY.

Mr. C. A. Briggs, F.E.S., exhibited two specimens of the egg of the crested lark, *Alauda cristata*, from Romney Marsh, 1895; two eggs of the golden eagle, *Aquila chrysaetos*, L., from Ardrossan, N.B., 1893; and a case of four stuffed specimens of the little auk, *Mergulus alle*, L., from Cambridgeshire, taken during the great frost of 1895.

Mr. H. Mead Briggs exhibited a pseudo-albino variety of the common sparrow, *Passer domesticus*, L., shot at Canterbury, Dec. 6th, 1894, and two cases of stuffed stoats and squirrels from Kent, all mounted by the exhibitor.



Mr. McArthur exhibited a preserved and mounted woodpecker and a case of grouse, together with a beautiful specimen of the white pheasant in case.

Mr. A. Beaumont, F.E.S., exhibited a fine albino specimen of *Sylvia sylvia*, the lesser whitethroat, from Yorkshire; specimens of *Upupa epops*, the hoopoe, and *Cygnus ferus*, the hooper swan, from Ireland.

Mr. C. H. Watson exhibited an albino specimen of the ringdove (*Columba palumbus*, L.), with a normal specimen for comparison.

Mr. J. A. Cooper exhibited a case with specimens of several species of tern, also a magnificent collection of British birds' eggs and many nests and clutches *in situ*.

Mr. B. W. Adkin exhibited a case of razorbills (*Alca torda*) captured on the Scilly Isles.

#### BOTANY.

Miss F. Whinstone exhibited a very large number of most admirably mounted specimens of plants collected by her in North-West Canada during the summer of 1894.

Miss M. E. Adkin exhibited a number of dried botanical specimens, especially noticeable being:—*Lilium martagon*, L., from Headley; *Lathyrus sylvestris*, L., from Deal; *Potentilla fruticosa*, L., from Teesdale; *Ranunculus auricomus*, L., from Hereford; *Lavatera arborea*, L., from Eastbourne; *Viola hirta*, L., from Oxshott; *Astrantia major*, L., from Isle of Man; and many others.

#### FUNGI.

For this distinctive and interesting exhibit the Society were indebted to Messrs. C. A. Briggs, F.E.S., H. Mead Briggs, Stanley Edwards, F.L.S., Chas. Oldham, and R. Turner, who very kindly undertook an excursion to Oxshott on the previous day for the express purpose of obtaining specimens. In this they were most successful as the great variety of species amply showed. The following is a list of the species, as far as could be ascertained by Dr. Cooke during the evening:—*Amanita muscaria*, L.; *A. rubescens*, W.; *A. phalloides*, W.; *Tricholoma columbella*, W.; *Clitocybe clavipes*, W.; *Collybia maculata*, W.; *C. laccata*, W.; *Mycena galericulata*, W.; *Hebeloma mesophæus*, W.; *Psalliota campestris*, L.; *Hypholoma fascicularis*, W.; *Psilocybe udus*, W.; *Panæolus phalenarum*, W.; *Russula ochroleuca*, W.; *R. queletii*, W.; *R. furcata*, W.; *Lactarius quietus*, W.;

*L. glyciosmus*, W.; *Paxillus atroamentosus*, W., rather rare; *P. involutus*, W.; *Cantharellus cibarius*, W.; *C. aurantiacus*, W.; *Cortinarius elatior*, W.; *C. cinnamomeus*, W.; *Boletus elegans*, W.; *B. granulatus*, W.; *B. bovinus*, W.; *B. scaber*, W.; *B. badius*, W.; *Polyporus rufescens*, W.; *P. schweinitzii*, W.; *P. versicolor*, W.; *P. perennis*, W.; *Calocera viscosa*, W.; *Sparassis crispa*, W.; *Lycoperdon gemmatum*, P.; and several undetermined species.

#### MICROSCOPICAL SECTION.

Among our members who kindly brought their microscopes were—

Mr. W. West, of Streatham, who exhibited living house fly (*Musca domestica*), flower of a *Sedum*, and sori of fern (*Davalia canariensis*).

Mr. W. E. West, who showed tooth of *Myliobates*, spiracle of goat moth larva (*Cossus ligniperda*, L.).

Mr. F. E. Filer, who exhibited Rotifers (*Meliceria ringens* and *Limnias ceratophylli*), Polyzoa (*Plumatella repens*).

Mr. A. W. Dennis, who exhibited seed of *Nemesia compacta* and wing of *Papilio polyctor*.

Among those who kindly aided us from other societies were—

Mr. J. D. Hardy, who exhibited a model of the Diatom *Helipelta metii* in clay  $\times 1000$ , and skeletons of the star-fish *Solaster papposii*, besides various drawings of microscopical objects.

Mr. W. Turner, President North Kent Entomological Society, who exhibited under the microscope arranged and grouped slides of Diatoms; arranged slide of insect eggs; arranged slide of sponge spicules; together with an assortment of slides appertaining to natural history.

Mr. Thomas W. Brown, member of North Kent Natural History Society, exhibited under two binocular microscopes various Diatomaciæ slides (selected and arranged) *Helipelta metii*, *Arachnoidiscus japonicus*, etc., etc., from various parts of the world.

An arranged slide of *Linneus pereger* was shown by polarized light. Numerous micro-photos of the moon's craters and mountains, also of Jupiter and Saturn, and other of these interesting minute photographs. Another set of slides showed the tongues and mouths of various insects.

One of the microscopes under the charge of Mr. Brown was lent by special permission of the North Kent Natural History Society by an unanimous vote of the members.

Mr. W. Burton exhibited the following :—

*Melicerta ringens*, the beautiful little tube-building rotifer. These were from a large colony developed in his own tanks at Holloway.

*Dero*, an Annelid or aquatic worm with respiratory organs in the tail. These are rarely observed, as the head is generally embedded in débris at the bottom of ponds or in decaying weeds, and the finger-like organs in tail only partly exposed; from Hayes Common.

*Daphnia reticulata*, water-flea, a very pretty little Crustacean.

Tadpole of newt (*Triton cristatus*), showing circulation in the branchiæ or gills.

*Polycystina*, forms of fossil siliceous skeletons of Radiolarian Rhizopods, obtained from Barbadoes earth.

Mr. H. G. Coombes exhibited transverse section of *Clematis* stem and various kinds of seeds.

The Society was also indebted to the following gentlemen who kindly brought microscopes and slides for the evening: Messrs. J. W. Hardy, H. Cooper, T. W. Brown, Mrs. T. W. Brown, Messrs. W. Turner and C. West.

#### MINERALS, FOSSILS, &C.

Mr. Chas. Oldham exhibited a large number of very fine polished Madrepores, mostly collected by himself from the shores of Devonshire, the pinpoint, sponge, starred, conglomerate, and moss varieties being very noticeable. He also showed a considerable number of fossil *Echinus* and allied genera from different geological formations.

Mr. Samuel Henson exhibited a series of rough and carved opals, showing the various stages of preparation, and models of the large historical diamonds.

Messrs. Cook & Sons exhibited, besides apparatus, several cases of birds, fish, and insects, which aided much to the embellishment of the room.

#### DIAGRAMS AND DRAWINGS.

Mr. Stanley Edwards, F.L.S., kindly lent a series of about twenty large diagrams showing the life history of typical species of the various sections of the Insecta, and of the Crustacea.

Mr. Welch, of Belfast, exhibited a series of photographs of scenes characteristic of the Geology of Ireland.

Mr. A. E. Pearce exhibited a portfolio containing a large number of designs in water-colours, all of them being studies of plants.

#### BOOKS.

Mr. R. Adkin exhibited "The Butterfly books of three generations," consisting of Moses Harris's "Aurelian," published 1766; "The Natural History of British Butterflies," by James Duncan, published 1835; and "The Lepidoptera of the British Isles," by Charles G. Barrett, published 1893.

#### LECTURES.

In the early part of the evening an admirable and much appreciated lecture was given by Mr. Fred. Enock, F.L.S., F.E.S., on "Insect Architects," illustrated by micro-photographic slides by means of the oxy-hydrogen lantern.

*Syllabus.*—Leaves cut by an architect—The architect—The leaf-cutting bee—A few of its tools—Its market basket—Foundation of its house—The art tapestry—Cutting-out patterns—Covering the walls—Compasses and two-foot rule not wanted—Wonderful precision—Can insects think?—Storing and preserving food—Childhood passes—A long sleep—New life—Coming out into the world—Once more to business.

This lecture was repeated later in the evening, and the Society is much indebted to Mr. Enock for his kindness in providing such an attractive feature in the Exhibition.

Dr. M. C. Cooke, M.A., LL.D., A.L.S., also gave a short lecture on "Fungi," with especial reference to their edibility, and supplemented it by notes upon the collection made by the members of the Society.

During the evening a selection of music was performed under the direction of Mr. WALTER LATTER, R.A.M., by Miss KATHLEEN LATTER, Miss G. PENNINGTON, Mr. V. MEDCALF, and Mr. A. C. BULMER BOOTH.



## The Variation of *Erebia æthiops*.

By J. W. TUTT, F.E.S. *Read Sept. 12th, 1895.*

My interest in *Erebia æthiops* dates back to 1884, when I was generously supplied with a large number of larvæ by the collectors living at Galashiels, who, I believe, obtained them by sweeping at night the grassy spots which they frequent in that neighbourhood. From these I bred, during July of that year, a long series of imagines, and I still possess eighteen specimens of that particular batch in my cabinet. Looking at those specimens now, they strike me as being a trifle small, the females distinctly less than the males. Probably this suggests that feeding under artificial conditions was not altogether enjoyed by them.

Running on through my British specimens, I find I have six specimens from Galashiels captured in 1888. These were sent in response to a request to get me a few of the more striking forms. The normal female is, as is well known, somewhat smoother and less bright than the male, and the transverse band less fulvous. Four of these six are females of a distinctly paler ground-colour, and one has the transverse band of a pale orange, almost yellow, tint. They exhibit, however, a uniformity of size with the only male sent which is very noticeable.

From Forres I have specimens just a shade larger than the Galashiels examples, the most striking point being the uniformity of size and the smallness of the ocellated spots in both males and females. The females are much paler in colour than the males. Rannoch supplies a long series, averaging a little less in wing-expanse than the Forres specimens, the uniformity of the spotting of the fore-wings—a double ocellated spot with a single one below—being remarkable. A series from Arran shows a larger race, the sexes uniform in size, but the females paler and much more strongly spotted than the males.

There is now a long series of about seventy specimens, captured by Dr. Chapman and myself in a walk over the hills from Gareloch-head to Cove in August, 1893. These show considerable uniformity in size, the females perhaps having slightly the advantage in average expanse of wing. Like the Forres specimens they cannot be said to be at all strikingly ocellated, the spots of the males being remarkably uniform and decidedly small, those of the females larger, but rarely exceeding three (with a trace of a fourth) on the fore-wings. The females, however, on the whole, are distinctly richer in ground-colour than those from the other localities.

I am astonished to find that I possess no English specimens in my series. I have had large numbers through my hands, but do not seem to have retained a single specimen.

I may now turn to the material which I have collected on the Continent. With the exception of single specimens captured at Aix-les-Bains (August 20th) and Bourg St. Maurice (July 30th) in 1894, both males of large size, those I exhibit to-night are 1895 captures. At Mendel, where the general collecting was much too good to specialise, I got a short series of a dozen specimens remarkable for their dark colour, large size, and tendency to get rid of the fulvous bands by dividing into sections, leaving fulvous rings with or without ocellated spots in them. The only female I captured at Mendel is, however, remarkably well ocellated.

It was in the Val d'Ampezzo though, in the woods on both sides of the valley below Cortina, that the insect was seen in the greatest abundance. On the lower slopes of the Croda di Lago and of the Sorapiss the insect was abundant, a small dark race, the male specimens of which were of a most intense velvety black, with a tendency to vary abnormally both in the size and number of the ocellated spots and in the extent of the fulvous band. The females were on the whole rather larger than the males, and were particularly well ocellated, with a tendency in many specimens for the fulvous to become distinctly orange; this is particularly noticeable on the under-sides of some specimens when compared with the Argyleshire series, which they most resemble in size.

We were evidently late for the species when we got to Bregenz, but in the wood-clearings on the slopes of the Pfänder the finest race of this species that I have ever seen, occurred. The specimens were exceedingly large and richly clad, the females marvellous in the richness of their fulvous bands and the large size and abundance of their ocellated spots, whilst a bright orange-banded specimen is most striking.

A very similar race occurred in the woods and on the roadside between Alstätten and Gais, but these were a shade smaller and evidently *passé*. I selected a few of the best we met with.

A few specimens, captured by Dr. Chapman at Andermatt, of the same large type completes my material. It will be seen that these are as large, although not quite so strikingly spotted, as the Bregenz specimens.

With this long series of some 320 specimens before us, it may be well for us to look a little more specially into the variation of this species than the foregoing general remarks attempt to do.

The ground-colour of the wing deserves perhaps the first consideration. If you look closely at the males you will see that their general colour is of a rich velvety black-brown, but that the peculiar glossy appearance occupies only the base of the fore and hind wings and ends some distance before the fulvous bands are reached. The female on the other hand has none of this rich appearance, but its ground-colour, in the darkest specimens, agrees rather with the outer portion of the wing of the male. The velvety appearance of the male is a distinct secondary sexual character, then, and is due to the

presence of the androconial scales, which in this species, occupy a very considerable area. But the males are not all of the same intensity. The deep black colour of the darkest of the Tyrolean specimens—those from Mendel and the Val d'Ampezzo—is not to be matched by the finest Scotch specimens, for there is scarcely a trace of brown in the intense black of this southern race. The females are also distinctly darker on the whole than the Scotch specimens, but in this respect the Val d'Ampezzo specimens must give place to the large black females from Bregenz which scarcely yield to the dark males in the depth of their tints. There is, however, a paler form of the female, to be taken with the darkest in every district, which is of a distinctly greyer tone, and the same dimorphic tendency is noticeable in the Scotch females, which are, however, of a distinctly browner tint in both forms.

The second interesting point for consideration is the variation in the fulvous band. On the fore-wings the most completely banded forms have it extending from the upper branch of the apical nervure to the inner margin of the wing, extending in some few specimens to the anal angle. There is, however, a very strong tendency to contraction at the lower edge, and the band usually becomes obsolete at some distance above the inner margin. It also fails centrally in some specimens, and then becomes divided into two separate spots. In width, too, there is a very great difference, from over one-fourth to about one-eighth of the width of the wing being the limit. It varies also in colour, being occasionally of an orange tint. The band on the hind-wing is subject to even greater variation. In some female specimens it is broad and continuous from the costa to the anal angle, and it varies from a broad richly coloured continuous band to utter obsolescence, the direction of suppression being the subdivision of the band into separate parts by the spread of the dark ground-colour along the nervures, the separate sections, as they become smaller, form round spots of fulvous colour, gradually lessening in size until they become perfectly obsolete. I have only one specimen truly obsolete in this direction.

The difference in the size and number of the ocelli is the most interesting line of variation. If the fulvous band on the fore-wing be examined, it will be observed that it runs transversely across the wing, from its origin below the costa to the inner margin, over an area which is occasionally divided into seven portions by the slightly darker nervures. It would appear to be the aim of the most strongly ocellated examples to place an ocellus in each of these seven spaces, and occasionally they come very near doing so. The spaces in which these ocellated spots are most frequent are 2, 3, and 5, and since the nervures bounding 2 and 3 are situated closely together, the spots are necessarily brought near together and have a double appearance. I have no specimen which does not possess the double ocellated spot, and only one specimen which does not possess some trace of the spot in section 5, but two others have the trace only on

one wing. Twelve specimens have this spot represented as a tiny black point, whilst quite 90 per cent. of the British males and 50 per cent. of the Continental males have it ocellated, the possession of the double ocellated spot and the ocellated spot in section 5 being quite characteristic. Usually the fourth ocellated spot developed is in section 4. It may occur only as a black point or become a large ocellus. It is very rare among males of British origin. Only half a dozen specimens out of my British males possess it in any form, and it does not occur at all among the males from Mendel. In the males from Cortina it is frequent, whilst it is exceptional for it not to be present in the males from Bregenz. Among the females I have only two from Galashiels that possess it, the remainder having but three spots, whilst a whole row of males and females from Rannoch and the females from Forres are without; this, however, is probably due to my only possessing a short series (from Forres), for two males from Forres show traces of it. All the Arran females that I have possess it, and almost 50 per cent. of the females from Coulpport. It is quite exceptional for the females from the Val d'Ampezzo to be without it; in only three of the Bregenz females is it lacking, and one of these has the spot in the 6th section developed.

The fifth ocellated spot developed usually falls in the sixth section. One female from Galashiels, one male from Forres, two females from Arran, one female from Coulpport, three females from Bregenz, one female from Gais (but not a single specimen from the Val d'Ampezzo), possess this spot, although some develop the sixth spot in series in section 1. Owing to the nearness of the nervures between which the topmost ocellus must fall, we find it always very small in size, and usually placed closely above the twin spots in sections 2 and 3. This topmost spot is found in no British specimen that I at present possess, but it occurs in one male specimen from Bregenz, one female specimen from Mendel Pass, six female specimens from the Val d'Ampezzo, and one male specimen from Gais. In no single case do the specimens that possess this spot in section 1 possess the spot in section 6. I need scarcely call attention to an analogous spot in *Pararge megæra* and other British species. The last spot that can possibly be developed is in the seventh section. One female specimen from Arran possesses this as a small ocellated spot touching the one in the sixth section. I find no trace of it in any other specimen.

No specimen possesses all seven spots. The female from Arran just referred to possesses six, those in sections 2, 3, 4, 5, 6, 7. Many possess five spots, which may be either those in sections 1, 2, 3, 4, 5, or those in 2, 3, 4, 5, 6, the former, so far as my specimens go, being almost entirely a Continental formula, the latter both Continental and British. Male specimens possessing either of these formulæ are exceedingly rare.

The size of the ocelli vary much. The possession of two small



twin ocellated spots in sections 2 and 3 with a small fulvous ring around, and the spot in section 4 reduced to a black point with a narrow fulvous cincture, gives a very peculiar aspect to the specimens.

The pattern of the hind-wings is arranged in exactly the same fashion as that of the fore-wings, and the arrangement of the nervures suggests a possibility of seven ocelli as in the fore-wings, but with little probability of there being more than five owing to the suppression of the first and seventh sections of the fulvous band. 5, 4, 3, 2, 1, 0 are the number of ocelli (more or less developed) that I can trace in my specimens, a perfectly black hind-wing representing the latter number—0. 3 and 4 are the most common numbers. It may be considered a very rare form in which the ocelli of the hind wing reach 5, or in which they drop below 3. The latter, however, happens more frequently than the former.

I have spent so much time in analysing the variation of the upper surface that I have altogether neglected what is of much greater importance to the students of natural selection, the variation of the under sides. Here we find a most complex colour development. There is first of all a general sexual dimorphism strongly developed. The males have the hind-wings a rich red brown, the females of a paler tint. If we examine closely we see that the females have the basal and outer areas of the fore-wings paler, and the fulvous band brighter and more distinctly inclining to orange in colour. The hind-wings may be divided into four sections, the basal area red-brown in the males, sparingly scattered with grey scales, then a red-brown transverse band, then a band more distinctly sprinkled with grey than the basal area (this contains traces of the ocelli less distinctly marked than on the upper wings), then an outer marginal red-brown band. In my specimens the basal area is scarcely distinguishable from the red-brown band in contact with it. The under sides of the males of the Val d'Ampezzo specimens are remarkably uniform, those from Mendel Pass, Bregenz, Rannoch, and (on the whole) those from Coulport, have the bands well marked.

The hind-wings of the females are divided into the same four-banded areas, but the dark red-brown central marginal bands of the male are distinctly paler and scattered with grey scales, whilst the pale basal and ocellated bands become so sprinkled with grey as to give them a very white appearance. In this direction the females from Bregenz are most charming, the two pale areas being of a lovely purple hue in many specimens. But the under-sides of the hind-wings of the females present a distinct colour dimorphism themselves. Instead of the form just described and which is of the same type as the underside of the male, there is a form (and among our Scotch specimens by far the most abundant form) in which the basal and ocellated bands are of a distinct yellow ochreous hue. When, as is sometimes the case, the ochreous bands present a strong contrast to the red-brown areas, the result is most striking.

It is true that in those fore-wings those spots which are in an ill-

developed condition on the upper side, do not reappear on the under surface, but all the large ocellated spots reappear without loss of size. This is not so on the hind wings, for the ocelli here are always most minute and form a series of white points on the edge of the pale band, scarcely discernible in many specimens. Intermediate forms between those described of course occur, and occasionally aberrational undersides. One striking specimen before me has the central red-brown band inclining to fuscous, which shows up remarkably well against the purple-grey basal and ocellated bands.

The forms I exhibit seem to fall naturally into three groups. (1) The large dark form from Grésy-sur-Aix, Bourg St. Maurice, Bregenz, Gais, and Andermatt, and which is probably the characteristic lowland form (up to 2000 or 3000 feet in Central and Southern Europe). This, I doubt not, is the true *æthiops*, and well deserves its name.

(2) The smaller black (male) from the Val d'Ampezzo, the mountain form of Southern Europe, occurring above 2000 or 3000 feet. This shows a tendency to the suppression of the fulvous band, which is often broken up into rounded sections containing the ocellated spots. This I would call var. *minor*.

(3) The British forms, which do not much exceed the last in wing expanse, but keep complete fulvous bands, and are of a browner hue than the Continental specimens. This might be called var. *britannica*.

There can be no doubt that my material distinctly shows these to be three local races, with tendencies to occasionally produce as aberrations the other forms under special conditions.

Staudinger renames Freyer's (55, 3-4) *neoridas*, calling it "var. et ab. *leucotenica*," and diagnoses it as "subtus fascia albicante," and gives as its range "Carniola, Helvetia (South), Dalmatia, and ? Italy." I take it that this form is not the same as the females with pale banded undersides described above, and which I consider as agreeing more with the typical underside of the male than the ochreous form. Elwes in his "Notes on the genus *Erebia*" ('Trans. Ent. Soc. Lond.,' 1889, p. 329) appears to have got somewhat mixed, for he gives Boisduval's (Ind., p. 23, Ic., 29, 1-4) *neoridas*, which Staudinger treats as a distinct species (Cat., p. 26, No 316) under the head of *æthiops*, overlooking that it is Freyer's *neoridas* that Staudinger treats as a var. of the latter species, and says of it, "Var. vel bona species." I would simply here call attention to the fact that it is Freyer's *neoridas* which Staudinger considers a variety of *æthiops*, and a suspicion that *Erebia neoridas*, Bdv., might be possibly confounded with *Erebia æthiops* var. *neoridas*, Fr., leads one to suppose that this was the reason for Staudinger re-naming the latter, var. *leucotenica*.

Another local race is reported from Armenia. This is the *melusina* of Herrich-Schäffer, which Staudinger diagnoses as "major. al. omn. fascia rufa lata." A race with a broad red fascia across all the

wings must be an extreme development of the largest form described above.

One very distinct aberrational form deserves a name. This is that in which the fulvous band is distinctly orange. It is decidedly rare in British localities; Dr. Chapman suggests about one in a hundred in Argyleshire, but it is more abundant on the Continent. For this form I have recently proposed the aberrational name *flavescens*.

### *Colias edusa*, 1895.

By E. M. MONTGOMERY. Read December 12th, 1895.

This species was common in the neighbourhood of Eastbourne during the second and third weeks of August, and probably earlier; but almost entirely disappeared after the heavy thunderstorms about the end of that month. It was most abundant on the hill sides facing the sea, between the town of Eastbourne and Beachy Head. In all twenty-three males and nineteen females, including one var. *helice*, were taken.

Three dilapidated females were secured over some living plants of Dutch clover, and deposited ova first on August 14th, and some number on the few succeeding days, amounting in all to between 170 and 180. The ova with few exceptions were deposited on the clover leaves, always on the upper surface, often several on one leaf, although many leaves were left quite untenanted.

The larvæ began to emerge on August 19th, five days after the ova were deposited. The young larva rests along the mid-rib of the leaflet on the upper side, and is thus, like the ovum, sheltered at night by the closing up of the clover leaf. The most forward larvæ completed their first moult August 25th, second moult August 28th, third moult September 1st, and fourth and final moult September 6th. Some larvæ were of course a long way behind these dates. The full-grown larva is smooth and velvety, exactly resembling the clover leaf in tint, the head being slightly paler. The body is thickest at about the third or fourth segment, and tapers from that point in both directions; very slightly towards the head, and more decidedly towards the tail. A yellow stripe runs along the spiracles, fading to white at the junctions of the segments, and deepening to orange just above each spiracle. The spiracles are white, and generally, but not always, surrounded by a thick black ring. About thirty larvæ became discoloured and died, most of these being among the most backward. The period of greatest mortality seems to be just after the final moult, when by far the greater part of these thirty died.

The first larva fixed up for pupation on the evening of the 10th September, twenty-four days after emergence from ovum, and pupated on the forenoon of the 12th. The time between the fixing up and the change varies according to temperature. The skin splits just behind the head on the back, after a succession of writhing

movements on the part of the larva ; these movements are continued until the larval skin is worked down to the tail, the head being free at an early stage of the operation ; the tip of the tail is then curved round beyond the shrivelled skin and fixed into the pad of silk, which the larva was holding with its anal claspers. Efforts are then made by the pupa to get rid of the larval skin, and these are generally successful ; but very often the skin remains in place. These efforts, however, may only be intended to fix the pupa more firmly, as they are continued after the skin has been dislodged. Only two larvæ spun up on the clover stems, nearly all fixed to the top of the net cover, as near as possible to the light. The pupa is angled, the wing-cases projecting in front in a strong curve. The colour is pale green, of much the same tint as the clover stems, the beak-like projection of the head being shaded with dark green. There is a yellowish white stripe just above the spiracles, continued more faintly along the inner margin of the wing-cases. There is also a bright brown stripe parallel to the whitish stripe on each side of the ventral surface of the body, starting from the edge of the wing-cases and disappearing before reaching the tail. There is a small black dot in the centre of the wing-cases, exactly corresponding with that on the fore-wings of the imago, and a row of six black dots along the hind margins of the wing-cases. The duration of the pupal state varies greatly according to temperature. The colouring of the fore-wings becomes gradually visible beneath the pupa-case as the time of emergence approaches, until every mark can be plainly seen. The segments of the body are extended to their utmost just before the insect emerges. The first pupa turned black and died.

The first two specimens (both males) which pupated on the 15th September emerged on September 27th, twelve days after pupation. The last (a female) emerged October 30th, the pupa having been kept in a warm room during the last fourteen days. The time between the laying of the first ovum and the emergence of the first imago was forty-four days, or thirty-nine from the emergence of the larva. Had the first pupa lived this would probably have been reduced by three days. The imagines began to emerge at about 7 a.m., and the bulk emerged between this time and 4 p.m. ; a few however emerged later than this, and during the very hot weather at the end of September a few emerged after dark, one as late as 10.15 p.m. on September 29th, there being no artificial light in the room at the time. One specimen among the latest was induced to emerge after dark by placing its cage close to a lighted lamp ; and another, the pupa-case of which had been cracked for some days and which was supposed to be dead, on being removed from its fastenings and the pupa-case still more broken, succeeded in freeing itself from the shell, and afterwards developed its wings quite perfectly. The number of larvæ which pupated was 146. Of these 131 emerged and developed quite perfectly ; 5 turned black and died ; 3 died when just ready to emerge, probably through cold ;



and 7 failed to get free from the pupa-case. The seven cripples were mostly backward ones, and were probably affected by the severe weather at the end of October. One or two were, however, among the emergences of the very hot spell at the end of September. In some instances one or more wings, which were free from the pupa-case, developed fully, while the remaining wings were firmly stuck to the case. After emergence the wings unfold very rapidly, being perfectly developed in about five minutes; though of course quite limp for some hours after.

The following is a table of emergences :

Date.	Succeeded.		Failed.	
	♂	♀	♂	♀
Sept. 27 . .	2 . .	— . .	— . .	— . .
„ 28 . .	1 . .	— . .	— . .	— . .
„ 29 . .	5 . .	4 . .	— . .	— . .
„ 30 . .	11 . .	11 . .	1 . .	— . .
Oct. 1 . .	3 . .	4 . .	— . .	— . .
„ 2 . .	4 . .	3 . .	— . .	— . .
„ 3 . .	5 . .	6 . .	— . .	— . .
„ 4 . .	4 . .	5 . .	— . .	— . .
„ 5 . .	3 . .	4 . .	— . .	1 . .
„ 6 . .	3 . .	4 . .	— . .	— . .
„ 7 . .	2 . .	2 . .	— . .	— . .
„ 8 . .	3 . .	2 . .	— . .	— . .
„ 9 . .	3 . .	1 . .	— . .	— . .
„ 10 . .	2 . .	— . .	— . .	— . .
„ 11 . .	2 . .	1 . .	— . .	— . .
„ 12 . .	2 . .	1 . .	— . .	— . .
„ 13 . .	2 . .	2 . .	— . .	— . .
„ 14 . .	2 . .	3 . .	1 . .	— . .
„ 15 . .	2 . .	1 . .	1 . .	1 . .
„ 16 . .	2 . .	2 . .	1 . .	1 . .
„ 17 . .	— . .	2 . .	— . .	— . .
„ 18 . .	— . .	1 . .	— . .	— . .
„ 19 . .	1 . .	— . .	— . .	— . .
„ 20 . .	— . .	1 . .	— . .	— . .
„ 21 . .	— . .	1 . .	— . .	— . .
„ 22 . .	— . .	2 . .	— . .	— . .
„ 23 . .	— . .	1 . .	— . .	— . .
„ 25 . .	— . .	1 . .	— . .	— . .
„ 27 . .	— . .	1 . .	— . .	— . .
„ 28 . .	— . .	1 . .	— . .	— . .
„ 30 . .	— . .	1 . .	— . .	— . .
	64 . .	67 . .	4 . .	3 . .
Add . .	4 . .	3 . .		
	68 . .	70 . .	= 138	

The expanse of wing varies from one and three eighths inches to slightly over two inches. The smallest specimen is a dwarf male, which emerged on the last day of September. With this exception all the very small specimens—about half a dozen—are females, and were the last to emerge. The sexes are on the whole of about equal size—that is to say, the size varies in both to the same degree, the largest males being fully equal to the largest females in expanse of wing.

A few specimens are abnormally shaped. One female has the tip of the left fore-wing prolonged, and another has both fore-wings narrower and more pointed than usual. One male has the right fore-wing shorter than the left, though quite as broad, the abnormal wing being very bluntly pointed and the hind margin strongly convex. Another male has both wings on the right side deeply notched, evidently caused by the belt of the pupa; several others are also slightly marked from the same cause.

There is no variation of any importance in ground-colour, though some of the small females are rather paler than usual. The dark borders of the wings vary in breadth, sometimes extending in a narrow streak along the inner margin of the fore-wings, but in others only just including the anal angle. In the males this border is always dusted with yellow scales on the fore-wings, but more so in some specimens than in others. In thickly dusted specimens the yellow scales are also present in the borders of the hind-wings, but in a much less degree. One male has the yellow ground-colour dusted with black scales for a short distance from the margin of the dark border of the fore-wings. Other males also show slight indications of this black dusting. The veins of the fore-wings are seldom marked with yellow scales where they cross the dark border, except those near the costa and the one which touches the anal angle. Sometimes, however, all the veins are so marked, but not across the whole breadth of the border, the yellow colouring always failing to reach one or both of the edges. In the borders of the hind-wings the veins near the anal angle are sometimes slightly marked with yellow, but this is more frequently absent altogether. In the female the borders are never dusted with yellow scales; but the yellow spots of the border vary from mere points to large and conspicuous blotches, both on the fore- and hind-wings. The smaller spots disappear entirely in dark specimens.

The central spot of the fore-wings varies greatly in size. At times it is narrow and crescent-shaped, and in one or two specimens it is unusually large and almost circular. It is sometimes centred with yellow, and at others dusted with yellow scales.

The underside varies in depth of tint, both in ground-colour and markings. The spots forming series parallel with the hind margins of both fore- and hind-wings, black in the former and rust-colour in the latter, vary in size and number. The spots nearest the anal angle are the largest, the others gradually diminishing in size, and in

some cases the last few disappearing entirely. The silver spot in the centre of the hind-wings is generally compound, but in two examples it is simple. The ring of rust-colour surrounding this spot varies greatly in breadth, being narrowest in the two simple spotted specimens.

## Notes on Sea Anemones (Actiniæ).

By EDWARD STEP, F.L.S. *Read October 24th, 1895.*

For the study of all the creatures that live upon or around the rocks between tide marks, I am most fortunately situated in my present home. The low cliff upon which I reside runs off in a broken foot-like extension, known as Pen-cabe, into the sea. There are several deep and wide fissures, locally called "drangs," and a large number of smaller cracks, as well as deep and shallow basins, hewn in its surface at different levels by tidal action. Beyond ordinary low tides there is the Long Drang, running parallel with the cliffs and about thirty feet across, separated from the sea by a broad barrier of rugged rocks almost completely covered by the huge fronds of *Laminaria*. It is, in fact, the border of the Laminarian zone. At ordinary low tides this drang is a clean-cut natural canal, with a few tall rocks standing out of the water in mid-channel, but after new and full moon the waters retire so far that, save for a few shallow pools, the drang is empty.

From this drang and the rocks and pools between it and the cliffs I obtained all but one of the anemones sent up for the Annual Exhibition on the 17th inst. The exception was *Cribrina effoeta* (Linn.), the so-called parasite-anemone, which is a deep-water species, and was caught a little farther out on a "spiller" line. It had sucked in the bait and so got hooked. This species is a Commensal, perching on full-sized shells of *Buccinum undatum* that are inhabited by large specimens of *Eupagurus bernhardus*. It looks a trifle ridiculous to see a weak creature like *Eupagurus* not merely dragging a big molluscan shell about, but on top of that a huge thick tower of flesh, four inches in height, surmounted by an expanding crown of creamy tentacles about as many inches broad. I have since had a number of these dredged from the oyster grounds at the mouth of the Truro river in Falmouth Harbour, where they are very plentiful. Some of the fishermen here tell me this anemone is a great nuisance from its habit of sucking the bait from their spillers.

But to return to my rocks. *Actinia equina* (Linn.), the Common Beadlet, is abundant, of course, between tide marks in all its wonderful variety of colouring, of which the most striking form is the large var. *fragacea*, its dark red column thickly sprinkled with

small green specks, which give it sufficient resemblance to a huge strawberry to justify its popular designation as the Strawberry anemone. The smaller bright crimson var. appears to have a special liking for the under-surface of big stones in deeper water.

*Urticina felina* (Linn.), the Dahlia Wartlet, is plentiful under overhanging ledges in pools, and at the bottom of narrow fissures, or anywhere that gravel accumulates in which it can clothe itself by means of the plentiful suckers on its column. It needs a practised eye to detect a closed Dahlia. I strongly disapprove of the way in which Ellis and others gave these creatures names borrowed from flowers, but there are one or two richly marked forms of *felina* to which the term dahlia may be fitly applied. Especially is this the case with the var. which Gosse labels *purpurea*, of which I sent a specimen for exhibition. After being in the aquarium for a short time *felina* gradually drops her coating of gravel as though aware that disguise is no longer effective. Instead of the low, squal, broad column almost hidden by the over-arching tentacles, as usually seen in the pools, she will now sometimes elevate her column to a height of four inches and exhibit the otherwise rarely seen thick parapet near the summit. *Felina* appears to be an almost omnivorous feeder judging by the mixture of rubbish turned out by newly caught specimens. Sponges, *flustra*, dogwhelks, limpets, and crabs do not seem out of the way, but with them I have seen turned out small seaweeds, such as the rosy *Griffithsia corallina*, and more remarkable still the exceedingly tough leaves of Samphire (*Crithmum maritimum*); and as though to aid in the trituration and digestion of these things, plenty of coarse sand. The sand was probably a mere accident, taken inadvertently whilst swallowing something else. A few evenings since a large *Blennius pholis* (the Shanny) in my possession managed to fall a victim to a large *felina*. *Pholis* I consider to be a peculiarly wideawake fish, swift in his movements though somewhat heavy, and I should not have expected *felina* to catch him napping. I believe he must have been deceived by the fact that *felina* was a new inhabitant of his vessel and was well coated with gravel; he probably took her for a rocky eminence upon which he might rest as is his wont. Anyway, I discovered him lying dead across her mouth, her stomach extruded and wrapping his underside. Digestion had already commenced, although little more than an hour before I had seen *pholis* in the best of health and spirits. He was about five inches long, and *felina* had evidently been unable yet to get him "end on" in order to swallow him.

*Anemonia sulcata* (Penn.), the Opelet, is very plentiful; the younger specimens crowded together and half-buried amid the corallines in the pools, but the adult specimens float off in their restless way, and attach themselves temporarily to rocks in much deeper water, or to the broad fronds of tangle.

*Cereus pedunculatus* (Penn.), the ridiculously-named Daisy Anemone



of which I have never yet seen a specimen that in the faintest way resembled *Bellis perennis*, is exceedingly common when you know how to look for it, and what to see. From its exasperating habit of attaching its base at the bottom of a narrow crack in the rock, it is difficult to get specimens without either spoiling them or spoiling your fingers. To most persons it is an invisible species, yet when you know it, it is a very striking form. In captivity it must have a stone beneath which it can bury the lower part of its column, and hide the whole if necessary. It is somewhat irritable, and extrudes a considerable quantity of the stinging threads, chiefly from its base. There are writers who have denied that these threads have any urticating property; but it is certain that these persons cannot have observed very patiently. Over and over again I have witnessed tragedies enacted in which these threads were the deadly weapons used. Only a few minutes prior to the writing of these notes, on looking into an aquarium, I discovered a *Trochus zizyphinus* partly out of its shell, and looking as though dead, yet it still adhered slightly to the glass. From it was a single white stinging thread, connecting it with the base of a *Cereus pedunculatus* that was changing quarters and lying detached on the gravel. I touched *Trochus*, and it sleepily pulled itself together, loosed its hold of the glass, and retired slowly as far into its shell as its operculum would permit. The movement irritated the thread, and it began to coil spirally in the middle. What was the effect of this thread movement on *Trochus* I cannot say, but from its shell there now poured out a milky fluid. I presume that the object of the Anemone was to disable the mollusk, that it might swallow it at leisure.<sup>1</sup>

*Cylistia undata* (Mull.), the Cave-dweller, is easily confused with *Cereus pedunculatus* until it is well known. Its burrowing habit is similar, but it chooses more retired nooks. It occurs in the pools of Pencabe, but is more abundant at Pednadden Point, on the opposite side of our little bay.

*Bunodes verrucosa* (Penn.), the Gem Pimplet, is an exquisite creature, though of simple colouring. I considered myself fortunate, some months ago, to find a few small specimens buried in sand at the base of a rock in the Long Drang; but now that I have it well "in my eye," I find it abundantly in all the rock-pools that are lined with *Corallina officinalis*. In such situations it is practically invisible, and I have amused myself by pointing out a group of three or four full-grown and fully-expanded individuals to sharp-eyed lads, from whom no bird can hide her nest in the densest hedge, but they have failed to see *Bunodes*, though my pointing finger almost touched them. This species readily adapts itself to a life of captivity, and freely produces its living young. The larvæ are retained for some time in the hollow tentacles of the parent, where they may easily be observed. When finally cast out, the young are about  $\frac{1}{6}$  of an inch in diameter, quite pellucid, and crowned with twelve tentacles. They

<sup>1</sup> Subsequent observation proved the correctness of this supposition.

constantly alter their form, being now almost globose, then become exceedingly elongated tubes, that change their stations after the manner of Geometer-larvæ by "looping." Then one becomes an elegant little "specimen-flower-glass," with a globular base, from which springs a funnel-shaded tube.

*Sagartia nivea*, Gosse, the Snowy Anemone, is exceedingly local here. It has several stations which for long I failed to discover, though I got one isolated specimen from a rock at low-water, and another that floated into our "porth" on a scrap of oar-weed. I have since found several colonies.

A couple of days after our Exhibition I took the opportunity afforded by a low spring-tide to pay a first visit to a mass of rocks, usually submerged, at Portcurnick, about half-a-mile away. The rocks are much broken up, great bosses standing up from sandy patches, and squared blocks are bordered with deep channels, through which every wave sends in a fierce current of water. At the base of the rocks, among the sand and gravel, *felinæ* of enormous proportions were packed in long lines. *Verrucosa* was there in plenty, but I would not notice them, for others caught my eye. There were limp masses of whitish jelly hanging on the vertical face of one rock, or depending from under the beetling brow of another; and with them were more elongated forms of a drab colour, inclining to red at the free end. Similar forms were slightly open and showed a peculiar pinkiness within that contrasted strangely with the dingy tints of the outside. This was a find, for the clear jelly masses, though puzzling at first, when half expanded revealed themselves fully, late that evening, by erecting their dumpy mass into a tall alabaster column, with a parapet near the top supporting the rich feathery crown of *Metridium senilis* (Linn.), the Plumose Anemone.

The others included two of Gosse's species that I had not previously found at Portscatho, namely, *Sagartia venusta*, Gosse, the Orange-disc Anemone, and *S. rosea*, Gosse. The former is a shy creature, not widely opening so readily as it closes. The dull orange disc is surrounded by very slender white tentacles with pellucid tips, and the bases crossed by a couple of grey bars, which give a peculiar, checkered appearance to the circumference of the disc. When the two species have fully withdrawn their tentacles, *venusta* and *rosea* may be easily mixed and passed as one species. *Rosea* has delicate, almost pellucid, tentacles, of a pale rose pink, the disc still paler. When removed, it pours out a great number of stinging threads from its column and base, but freely opens to reveal its charms. These specimens were obtained from an awkward position. We had to jump upon an island-rock, and lying prone, with the upper part of the body hanging down one side, detach the anemones from the sloping under-surface of the rock whilst hanging on by the legs only. It was done at the risk of losing knife, anemones, or self in the eddying and swirling waters beneath, to say nothing of

the risk of apoplexy. There was another form obtained which appears to be a var. of *rosea*, with colourless disc and tentacles.

. From the same group of rocks I obtained *Sagartia miniata*, Gosse, the Scarlet-fringed Anemone, with an orange column spotted with white suckers, an outer row of small orange tentacles, the longer inner rows being pellucid, though dusky in hue.

But the find that pleased me most that day was a species for which I had searched all the rocks of Pencabe without result.<sup>1</sup> Yet here it was in abundance on the vertical face of the rough rock, its brilliant yellow and emerald columns rising from amid *Serpulæ*, tube-worms, acorn shells, and varicoloured *Botrylli*. Being out of water their tentacles were withdrawn, but I knew them for *Corynactis viridis*, the Globehorn, at once. They stand before me as I write, their cup-like green columns fully erect, and their slightly conical tentacles each ending in a globose crimson head. Other specimens have the column crimson or brown, with pearl-like knobs to the tentacles. They are very small—about half an inch across the top and of equal height—but exceedingly beautiful. On a flake of rock about  $1\frac{1}{2}$  inches square there are thirteen specimens of *Corynactis*, besides the other creatures I have mentioned, all in full working order; to say nothing of various low crustaceans, *Caprellæ* and the like, that range around in an inquisitive manner, and will probably meet their fate in a voyage of discovery to the Globehorn's interior before long.

Such is a brief list of the littoral Actiniæ of Portscatho on the south coast of Cornwall, so far as I have yet been able to work them out.

<sup>1</sup> Since writing these notes I have found *Corynactis* on the "barrier reef" that bounds the Long Drang.—E. S.

# A LIST OF BRITISH STALK-EYED CRUSTACEA,

*Compiled for the use of Readers of Bell's "History of British  
Stalk-eyed Crustacea."*

BY EDWARD STEP, F.L.S.

(Communicated November 14th, 1895.)

Family.	Genus and Species.	Synonyms used by Bell.
CANCRIDÆ	<i>Xantho incisus</i> , Leach	<i>Xantho florida</i> , page 51.
"	<i>X. hydrophilus</i> , Herbst	<i>X. rivulosa</i> , 54.
"	<i>X. hydrophilus</i> var. <i>tuberculata</i> (Couch)	<i>X. tuberculata</i> , 359.
"	<i>Cancer pagurus</i> (L.)	<i>C. pagurus</i> , 59.
"	<i>Pilumnus hirtellus</i> (Linn.)	<i>P. hirtellus</i> , 63.
"	<i>Pirimela denticulata</i> (Mont.)	<i>P. denticulata</i> , 72.
PORTUNIDÆ	<i>Carcinus mœnas</i> (Penn.)	<i>C. mœnas</i> , 76.
"	<i>Portumnus latipes</i> (Penn.)	<i>P. variegatus</i> , 85.
"	<i>Portunus puber</i> (Linn.)	<i>P. puber</i> , 90.
"	<i>P. depurator</i> (Linn.)	<i>P. depurator</i> , 101.
"	<i>P. corrugatus</i> (Penn.)	<i>P. corrugatus</i> , 94.
"	<i>P. arcuatus</i> , Leach	<i>P. arcuatus</i> , 97.
"	<i>P. pusillus</i> , Leach	<i>P. pusillus</i> , 112.
"	<i>P. holsatus</i> , Fabr.	<i>P. holsatus</i> , 109.
"	<i>P. marmoreus</i> , Leach	<i>P. marmoreus</i> , 105.
"	<i>P. tuberculatus</i> , Roux	
"	<i>Polybius henslowii</i> , Leach	<i>P. henslowii</i> , 116.
"	<i>Bathynectes superbus</i> (Costa)	
"	<i>B. longipes</i> (Risso)	<i>Fortunus longipes</i> , 361.
CORYSTIDÆ	<i>Corystes cassivelaunus</i> (Penn.)	<i>C. cassivelaunus</i> , 159.
"	<i>Atelecyclus septemdentatus</i> (Mont.)	<i>A. heterodon</i> , 153.
"	<i>Thia residuus</i> (Herbst)	<i>T. polita</i> , 365. <sup>5</sup> / <sub>3</sub>
OCYPODIDÆ	<i>Gonoplax rhomboides</i> (Linn.)	<i>G. angulata</i> , 130.



Family.	Genus and Species.	Bell's Synonyms.
PINNOTHER- RIDÆ	<i>Pinnotheres pisum</i> (Linn.)	<i>P. pisum</i> , 121.
"	<i>P. veterum</i> , Bosc.	<i>P. veterum</i> , 126.
INACHIDÆ	<i>Macropodia rostratus</i> (L.)	<i>Stenorynchus phalangium</i> , 2.
"	<i>M. longirostris</i> (Fab.)	<i>S. tenuirostris</i> , 6.
"	<i>Achæus cranchii</i> , Leach	<i>A. cranchii</i> , 10.
"	<i>Inachus dorsettensis</i> (Penn.)	<i>I. dorsettensis</i> , 13.
"	<i>I. dorynchus</i> , Leach	<i>I. dorynchus</i> , 16.
"	<i>I. leptochirus</i> , Leach	<i>I. leptochirus</i> , 18.
MAIIDÆ	<i>Maia squinado</i> (Herb.)	<i>M. squinado</i> , 39.
"	<i>Hyas araneus</i> (Linn)	<i>H. araneus</i> , 31.
"	<i>H. coarctatus</i> (Leach)	<i>H. coarctatus</i> , 35.
"	<i>Pisa tetraodon</i> (Penn.)	<i>P. tetraodon</i> , 22.
"	<i>P. tribulus</i> (Linn.)	<i>P. gibbsii</i> (Leach), 27.
PARTHENO- PIDÆ	<i>Eurynome aspera</i> (Penn.)	<i>E. aspera</i> , 46.
I.EUCOSIIDÆ	<i>Ebalia tuberosa</i> (Penn.)	<i>E. pennantii</i> , 141.
"	<i>E. tumefacta</i> (Mont.)	<i>E. bryerii</i> , 145.
"	<i>E. cranchii</i> , Leach	<i>E. cranchii</i> , 148.
"	<i>E. nux</i> , Norman	Not known in Bell's day.
DROMIDÆ	<i>Dromia vulgaris</i> , Milne- Edw.	<i>D. vulgaris</i> , 369.
LITHODÆ	<i>Lithodes maia</i> (Linn.)	<i>L. maia</i> , 165.
PAGURIDÆ	<i>Pagurus striatus</i> , Latr.	<i>P. fasciatus</i> , 375.
"	<i>Eupagurus bernhardus</i> (Linn.)	{ <i>P. bernhardus</i> , 171. <i>P. ulidianus</i> , 181.
"	<i>E. cuanensis</i> (Thomps.)	<i>P. cuanensis</i> , 178.
"	<i>E. prideaux</i> (Leach)	<i>P. prideauxi</i> , 175.
"	<i>E. pubescens</i> (Kroyer)	<i>P. thompsoni</i> , 372.
"	<i>E. sculptimanus</i> (Lucas)	<i>P. forbesii</i> , 186.
"	<i>E. excavatus</i> (Herb.)	Unknown to Bell.
"	<i>Anapagurus hyndmanni</i>	<i>P. hyndmanni</i> , 182.
"	<i>A. lævis</i> (Thomps.)	<i>P. lævis</i> , 184.
"	<i>A. chiroacanthus</i> (Lilljeb.)	Unknown to Bell.
"	<i>Diogenes varians</i> , Costa	<i>P. dilwynii</i> , 377.
PORCELLANIDÆ	<i>Porcellana platycheles</i> (Pen- nant)	<i>P. platycheles</i> , 190.
"	<i>P. longicornis</i> (Linn.)	<i>P. longicornis</i> , 193.
GALATHEIDÆ	<i>Galathea squamifera</i> , Leach	<i>G. squamifera</i> , 197.
"	<i>G. nexa</i> , Embleton	<i>G. nexa</i> , 204.
"	<i>G. dispersa</i> , Sp. Bate	{ Unknown to Bell.
"	<i>G. intermedia</i> , Lilljeb.	
"	<i>G. strigosa</i> , Fabr.	<i>G. strigosa</i> , 200.
"	<i>Munida rugosa</i> (Fabr.)	<i>Munida rondeletii</i> , 208.

Family.	Genus and Species.	Bell's Synonyms.
CALLIANAS- SIDÆ	<i>Callianassa subterranea</i> , Leach	<i>C. subterranea</i> , 217.
„	<i>Upogebia stellata</i> , Leach	<i>Gebia stellata</i> , 223.
AXIIDÆ	<i>Axius stirynchus</i> , Leach	<i>A. stirynchus</i> , 228.
THAUMASTO- CHELIDÆ	<i>Calocaris macandreae</i> , Bell	<i>C. macandreae</i> , 233.
SCYLLARIDÆ	<i>Arctus ursus</i> , Dana	Unknown to Bell.
PALINURIDÆ	<i>Palinurus vulgaris</i> , Latr.	<i>P. vulgaris</i> , 213.
„	<i>Nephrops norvegicus</i> (Linn.)	<i>P. norvegicus</i> , 251.
„	<i>Astacus gammarus</i> (Linn.)	<i>Homarus vulgaris</i> , 242.
POTAMOBIIIDÆ	<i>Potamobia pallipes</i> (Lere- boullet)	<i>Astacus fluviatilis</i> , 237.
PENÆIDÆ	<i>Peneus caramote</i> (Risso)	<i>P. caramote</i> , 318.
CRANGONIDÆ	<i>Crangon vulgaris</i> (Linn.)	<i>C. vulgaris</i> , 256.
„	<i>C. allmanni</i> , Kinahan	Not known to Bell.
„	<i>Egeon fasciatus</i> , Risso	<i>Crangon fasciatus</i> , 259.
„	<i>E. sculptus</i> (Bell)	<i>Cr. sculptus</i> , 263.
„	<i>Pontophilus spinosus</i> , Leach	<i>Cr. spinosus</i> , 261.
„	<i>Cheraphilus trispinosus</i> (Hailstone)	<i>Cr. trispinosus</i> , 265.
„	<i>C. nanus</i> , Kroyer	<i>Cr. bispinosus</i> , 268.
„	<i>C. echinulentus</i> , M. Sars	} Unknown to Bell.
„	<i>C. neglectus</i> , G. O. Sars	
NIKIDÆ	<i>Nika edulus</i> , Risso	<i>N. edulis</i> , 275.
ALPHEIDÆ	<i>Alpheus ruber</i> , M.-Edw.	<i>A. ruber</i> , 271.
„	<i>A. affinis</i> , Guise	Unknown to Bell.
„	<i>Athanas nitescens</i> , Leach	<i>A. nitescens</i> , 261.
HIPPOLYTIDÆ	<i>Caridion gordonii</i> , Sp. Bate	Unknown to Bell.
„	<i>Hippolyte varians</i> , Leach	<i>H. varians</i> , 286.
„	<i>H. viridis</i> (Otto)	} Unknown to Bell.
„	<i>H. fascigera</i> , Gosse	
„	<i>H. producta</i> , Norman	
„	<i>H. gaimardii</i> , M.-Edw.	
„	<i>Spirontocaris spinus</i> (Sowerby)	<i>H. pandaliformis</i> , 294.
„	<i>S. cranchii</i> (Leach)	<i>H. spinus</i> , 284.
„	<i>S. pusiola</i> (Kroyer)	<i>H. cranchii</i> , 288.
PANDALIDÆ	<i>Pandalus montagui</i> , Leach	Unknown to Bell.
„	<i>P. brevirostris</i> , Rathke	<i>P. annulicornis</i> , 297.
PONTONIIDÆ	<i>Typton spongicola</i> , Costa	Unknown to Bell.
PALÆMONIDÆ	<i>Leander serratus</i> (Penn.)	„ „
„	<i>L. squilla</i> (Linn.)	<i>Palæmon serratus</i> , 302.
„	<i>L. fabricii</i> (Rathke)	<i>P. squilla</i> , 302.
		<i>P. leachii</i> , 407.

Family.	Genus and Species.	Bell's Synonyms.
PALÆMONIDÆ	<i>Palæmonetes varians</i> (Leach)	<i>Palæmon varians</i> , 309.
PASIPHÆIDÆ	<i>Pasiphæa sivado</i> (Risso)	<i>P. sivado</i> , 312.
OODEOPIDÆ	<i>Autonomæa olivii</i> , Risso	} Unknown to Bell.
LOPHOGAS- TRIDÆ	<i>Lophogaster typicus</i> , M. Sars	
EUPHAUSIDÆ	<i>Rhoda inermis</i> (Kroyer)	} Unknown to Bell.
"	<i>R. jardineana</i> , Sim.	
"	<i>Nyctiphanes norvegica</i>	} <i>T. couchii</i> , 346.
"	<i>N. couchii</i>	
"	<i>Thysanoessa neglecta</i> , Kroyer	} Unknown to Bell.
"	<i>T. longicaudata</i> (Kroyer)	
"	<i>Nematoscelis megalops</i> , Sars	} <i>M. chameleon</i> , 336.
MYSIDÆ	<i>Mysis flexuosus</i> (Müll.)	
"	<i>M. vulgaris</i> , Thomps.	<i>M. vulgaris</i> , 339.
"	<i>M. neglecta</i> , Sars	} Unknown to Bell.
"	<i>M. inermis</i> , Rathke	
"	<i>M. helleri</i> , Sars	
"	<i>M. arenosa</i> , Sars	
"	<i>M. spiritus</i> , Norman	
"	<i>M. ornata</i> , Sars	
"	<i>M. lamorna</i> , Couch	
"	<i>M. parkeri</i> , Norman	
"	<i>M. relicta</i> , Lovén	
"	<i>Macropsis slabberi</i> (van Beneden)	
"	<i>Heteromysis formosa</i> , S. J. Smith	
"	<i>Mysidopsis didelphys</i> (Nor- man)	} Unknown to Bell.
"	<i>M. gibbosa</i> , Sars	
"	<i>M. angusta</i> , Sars	
"	<i>M. hibernica</i> , Norman	
"	<i>Leptomysis lingvura</i> , Sars	
"	<i>L. gracilis</i> , Sars	
"	<i>Anchiolus agilis</i> , Sars	
"	<i>Erythrops serratus</i> , Sars	
"	<i>E. erythropthalmus</i> (Goës)	
"	<i>E. elegans</i> , Sars	
"	<i>Siriella norvegica</i> , Sars	
"	<i>S. clausii</i> , Sars	
"	<i>S. jaltensis</i> , Czerniavsky	
"	<i>S. brooki</i> , Norman	
"	<i>S. armata</i> (M.-Edw.)	
"	<i>Pseudosiriella frontalis</i> (M.-Edw.)	

Family.	Genus and Species.	Bell's Synonyms.
MYSIDÆ	<i>Gastrosaccus sanctus</i> (van Beneden)	} Unknown to Bell.
"	<i>G. spinifer</i> (Goes)	
"	<i>Haplostylus normani</i> (Sars)	
SQUILLIDÆ	<i>Squilla mantis</i> , Rondelet	<i>S. mantis</i> , 351.
"	<i>S. desmarestii</i> , Risso	<i>S. desmarestii</i> , 354.
CUMIDÆ	<i>Cuma scorpioides</i> (Mont.)	<i>Cuma edwardsii</i> , <sup>1</sup> 326.
"	<i>C. audouinii</i> , M.-Edw.	<i>C. audouinii</i> , <sup>1</sup> 328.
"	<i>C. arenosa</i> (Goodsir)	<i>Bodotria arenosa</i> , 333.
"	<i>C. pulchella</i> (Sars)	Unknown to Bell.
"	<i>Iphinoe trispinosa</i> (Goodsir)	<i>Cuma trispinosa</i> , 329.
"	<i>I. tenella</i> , Sars	} Unknown to Bell.
"	<i>Cumopsis edwardsii</i> (Sp. Bate.)	
"	<i>C. longipes</i> (Dohrn)	
VAUNTHOM- PSONIDÆ	<i>Vaunthompsonia cristata</i> , Sp. Bate	
LEUCONIDÆ	<i>Leucon nasica</i> , Kröyer	
"	<i>Eudorella emarginata</i> (Kröyer)	}
"	<i>E. truncatula</i> (Sp. Bate)	

<sup>1</sup> The figures of these two in Bell are transposed.



# LIST OF MEMBERS

Chief subjects of Study :—*h*, Hymenoptera ; *o*, Orthoptera ; *he*, Hemiptera ; *n*, Neuroptera ; *c*, Coleoptera ; *d*, Diptera ; *l*, Lepidoptera ; *ool*, Oology ; *orn*, Ornithology ; *r*, Reptilia ; *m*, Mollusca ; *cr*, Crustacea ; *b*, Botany ; *mi*, Microscopy ; *e*, signifies Exotic forms.

## YEAR OF ELECTION.

- 1886 ADKIN, B. W., Brandon House, Morden Hill, Lewisham, S.E.  
*l, orn.*
- 1882 ADKIN, R., F.E.S., *Hon. Treasurer*, Wellfield, 4, Lingard's  
Road, Lewisham, S.E. *l.*
- 1891 ANDERSON, R. J., Suez.
- 1895 ASHBY, SIDNEY R., 8, Canterbury Terrace, Maida Vale, N.W. *l.*
- 1895 ASHDOWN, W. J., Belmont Road, Leatherhead. *l.*
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Nor-  
folk. *l.*
- 1888 AULD, H. A., 209, Stanstead Road, Forest Hill, S.E. *l.*
- 1887 BARCLAY, F. H., F.E.S., Leyton, Essex. *l, orn, palæontology.*
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., *Vice-President*, 39, Linden Grove  
Nunhead, S.E. *l, m.*
- 1896 BARTLETT, A. H., M.A., 34, Vanbrugh Park, Blackheath, S.E.
- 1889 BEAUMONT, A., F.E.S., The Red Cottage, Pond Road, Black-  
heath, S.E. *l, c, orn.*
- 1888 BENNETT, W. H., 15, Wellington Place, Hastings. *h, c.*
- 1893 BILLINGHURST, H., 35, Granville Park, Lewisham, S.E. *l, c.*
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road,  
Peckham, S.E. *h, o, c, d, he.*
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*
- 1896 BOWEN, F. A., 11, Buckland Crescent, Hampstead, N.W. *l.*
- 1895 BOWMAN, K., 18, Victoria Road, Clapham Common, S.W. *l.*
- 1887 BRIGGS, C. A., F.E.S., Surrey House, Leatherhead, Surrey.  
*l, m, n, o, British fishes.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Surrey House, Leatherhead. *l.*
- 1891 BRIGGS, H. MEAD, 37, Nunnery Fields, Canterbury, Kent. *l.*

YEAR OF  
ELECTION.

- 1890 BRIGHT, P., F.E.S., Roccabrunna, Bournemouth. *l*.
- 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l*.
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l*.
- 1895 BROOKS, W., Grange Hall, Rotherham. *l*.
- 1890 BROWN, E. W., Capt., 5, Victoria Terrace, Enniskillen, Ireland. *l*.
- 1890 BRYANT, G., F.E.S., 70, Chesilton Road, Fulham Road, S.W. *l*.
- 1890 BUTLER, W. E., Hayling House, Oxford Road, Reading. *l, c*.
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l*.
- 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l*.
- 1886 CARPENTER, J. H., "Shirley," St. James's Road, Sutton, Surrey. *l*.
- 1877 CARRINGTON, J. T., 1, Northumberland Avenue, W.C. *l, cr*.
- 1872 CHAMPION, G. C., F.Z.S., F.E.S., Heatherside, Horsell, Woking, Surrey. *c*.
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood, S.E. (*Hon. member*). *h, l, c*.
- 1895 CHIPPS, F. W., 1, Castlenau Terrace, Barnes, S.W.
- 1888 CHITTENDEN, D., Willesboro' Lees, Ashford, Kent. *l*.
- 1896 CLARK, F., Paddington Infirmary, W. *mi*.
- 1887 CLARK, J. A., F.E.S., The Broadway, London Fields, E. *l*.
- 1888 CLARKE, A. L., 24, Estelle Road, Gospel Oak, N.W. *l, b*.
- 1879 CLODE, W. (*Life member*).
- 1884 COOK, A. E., 31, Lower Road, Rotherhithe, S.E. *l, orn, r*.
- 1885 CROKER, A. J.,
- 1891 DACIE, J. C., 105, Upper Richmond Road, Putney, S.W. *m, l*.
- 1886 DAY, G., F.R.M.S., 11, Chesterton Road, North Kensington, W. *orn, mi*.
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l*.
- 1889 DENNIS, A. W., 48, Mansfield Street, Kingsland Road, E. *l*.
- 1890 DENNIS, G. C., F.E.S., 39, Blossom Street, York. *l*.
- 1890 DOBRÉE-FOX, Rev. E. C., Castle Moreton Vicarage, Tewkesbury. *l*.
- 1884 DOBSON, H. T., F.E.S., Douglas Villa, Acacia Road, New Malden, Surrey. *l, orn*.
- 1886 DUNNING, J. W., M.A., F.L.S., F.Z.S., F.E.S., 4, Talbot Square, W. (*Hon. member*).
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, Kidbrook Lodge, Blackheath, S.E. *l, e l*.

YEAR OF  
ELECTION.

- 1896 ELDRIDGE, A., Christ Church Schools, Alpha Road, Surbiton Hill. *l.*
- 1877 ELISHA, G., F.E.S., 122, Shepherdess Walk, City Road, N. *l.*
- 1886 ENOCK, F., F.E.S., 21, Manor Gardens, Upper Holloway, N. *d, mi.*
- 1889 FARRANT, M., St. Thomas, Exeter. *l.*
- 1894 FELL, FRANCIS, 21, Whitehall Road, Anerley, S.E. *l.*
- 1888 FENN, C., F.E.S., Eversden House, 83, Burnt Ash Hill, S.E. *l.*
- 1888 FENTON, F. E., F.R.C.S., M.R.C.P., F.I.Inst., Langstone, Ealing, W.
- 1872 FICKLIN, A., Norbiton, Surrey. *l.*
- 1891 FILER, F. E., 58, Southwark Bridge Road, S.E. *l.*
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Fairlawn House, Worthing, Sussex (*Life member*). *l.*
- 1889 FORD, A., Glen Mount, 107, Braybroke Road, Hastings. *l, c.*
- 1891 FORRESTER, A. C., 99, Endlesham Road, Balham, S.W. *l.*
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Mereworth, near Maidstone, Kent. *l.*
- 1886 FROHAWK, F. W., F.E.S., 39, Dornton Road, Balham, S.W. *l. orn, r, gen. zoo.*
- 1895 FURNEAUX, W., F.R.G.S., "Penlee," Ommaney Road, New Cross, S.E. *l, pond life, gen. zoo.*
- 1889 GERRARD, V., 69, Dunsmure Road, Stamford Hill, N. *l.*
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l.*
- 1885 GOLDTHWAITE, O. C., F.E.S., Meadow Side, Edinburgh Road, Carshalton, Surrey. *l.*
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Apsley Road, Clifton, Bristol. *l.*
- 1895 GRIFFITHS, G. C., 43, Caledonia Place, Clifton, Bristol.
- 1893 HALL, A., 16, Park Hill Rise, Croydon, Surrey. *l, e l, ool.*
- 1888 HALL, A. E., F.E.S., Norbury, Sheffield. *l.*
- 1884 HALL, T. W., F.E.S., *Vice-President*, Stanhope, The Crescent, Croydon, Surrey. *l.*
- 1891 HAMM, A. H., 24, Hatherley Road, Reading. *l.*
- 1892 HARRISON, A., F.C.S., Thames Sugar Refinery, Silvertown, E.
- 1887 HAYWARD, H., 53, Fenwick Road, Peckham, S.E.
- 1896 HEADON, H. W., Grove Park, Denmark Hill, S.E.

YEAR OF  
ELECTION.

- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill,  
S.E. *l*.
- 1886 HENDERSON, J., 24, Birchin Lane, E.C. *l, orn*.
- 1890 HILL, H. A., F.E.S., 4, Rosslyn Gardens, Hampstead, N.W. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1889 HINCHLIFF, Miss K. M., Worlington House, Instow, N. Devon.  
*l, e l*.
- 1888 HOPKINS, H. E., 153, Camden Grove North, Peckham, S.E. *l*.
- 1889 HORNE, A., 52, Irvine Place, Aberdeen. *l*.
- 1886 JÄGER, J., 180, Kensington Park Road, Notting Hill, W. *l*.
- 1887 JENNER, J. H. A., F.E.S., 4, East Street, Lewes, Sussex. *l, c,  
d, m, b*.
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow, E. *l*.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaske  
House, nr. Monaghan, Ireland. *l, m, marine invertebrata*.
- 1887 KEDGLEY, C., Hibernia Chambers, Borough, S.E.
- 1887 KELSALL, Rev. J. E., East Boldre Vicarage, nr. Southampton.  
*orn, r*.
- 1884 KENWARD, J., Rosslyn, New Eltham, Kent. *l*.
- 1888 KNIGHT, E., 1, Phoenix Villas, Devonshire Road, Merton, S.W.
- 1894 LAMB, H., Lime Villas, Bower Street, Maidstone. *l*.
- 1892 LARKIN, J. W., 48, Buckleigh Road, Streatham Common, S.W.
- 1894 LAWRENCE, H. B., 1, Derwent Road, Anerley, S.E. *l*.
- 1889 LEGROS, A. V., 57, Brook Green, Hammersmith, S.W.
- 1889 LEMMON, C. H., 42, Lower Road, Rotherhithe, S.E.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l*.
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L.,  
F.R.S., F.L.S., F.G.S., F.E.S., etc., High Elms, Down,  
near Farnboro', Kent (*Hon. member*). *h, b*.
- 1896 LUCAS, W. J., B.A., 21, Knight's Park, Kingston-on-Thames.  
*l, o, n, m*.
- 1890 McARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview,  
Clarendon Road, Lewisham, S.E. (*Hon. member*). *n*.
- 1889 M'LACHLAN, W. H., 70, Croxted Road, West Dulwich, S.E. *l*.
- 1892 MAIN, H., Thames Bank House, East Greenwich, S.E. *l*.



YEAR OF  
ELECTION.

- 1886 MANGER, W. T., F.E.S., 100, Manor Road, New Cross, S.E.  
*l, c, cr.*
- 1889 MANSBRIDGE, W., F.E.S., 9, The Green, Stratford, E. *l.*
- 1888 MARSHALL, A., The Caxtons, Knebworth, Herts. *l.*
- 1885 MERA, A. W., 1, Lothian Villas, Capel Road, Forest Gate, E. *l.*
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
- 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W.
- 1896 MONINGTON, H. W., 141, Brownwood Road, Wandsworth  
 Common, S.W. *b.*
- 1896 MONTGOMERY, ARTHUR M., 32, The Grove, Ealing, W. *l.*
- 1896 MONTGOMERY, EDMUND M., 32, The Grove, Ealing, W. *l.*
- 1880 MONTIERO, SENOR A. DE C., F.E.S., Rua do Alacrine, Lisbon.
- 1889 MOORE, H., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l,*  
*e h, e d, mi.*
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1889 NICHOLSON, W. E., F.E.S., Lewes, Sussex. *l.*
- 1886 NUSSEY, B. L., 167, Jarvis Street, Toronto, Ontario, Canada. *l.*
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South  
 Woodford, Essex. *l.*
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1895 PARTRIDGE, Col. C. E., 20, Hornsey Rise Gardens, Crouch  
 End. *l.*
- 1894 PEACH, A. W., 9, Holly Road, Chiswick, W. *l.*
- 1884 PEARCE, A. E., 12, Marius Road, Upper Tooting, S.W. *b.*
- 1888 PEARCE, J., 4, Borough High Street, London, S.E.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.  
*l, h, d.*
- 1888 PERKS, F. P., 41, St. Martin's Lane, Charing Cross, W.C.  
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- 1889 PERRY, Rev. J. F., St. Wilfrid's College, Oakamoor, Stoke-on-  
 Trent. *l, c.*
- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Hudders-  
 field. *l.*
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 REINDORP, J., 9, Wordsworth Avenue, East Ham, E. *o, l.*

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 1893 ROBINSON, F. J., Jun., 49, Charing Cross, W.C. *l.*  
 1894 ROBINSON, L., 54, Boundary Road, N.W. *l.*  
 1888 ROBSON, H., 5, Winterwell Road, Brixton Hill, S.W. *l. b.*  
 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*  
 1887 ROUTLEDGE, G. B., F.E.S., 50, Russell Square, W.C. *l.*  
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 1887 RUSS, P., Culleenamore, Sligo, Ireland. *l.*  
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- 1891 SABEL, E., F.Z.S., F.E.S., F.R.G.S., Linton House, South Side,  
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 1886 SALWEY, R. E., F.E.S., Sun Gate, Hook Road, Kingston  
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 1888 SAUZÉ, H. A., 4, Mount Villas, Sydenham Hill Road, S.E. *l.*  
 1895 SEARANCE, N. F., L.R.C.P., M.R.C.S., Mitcheldean,  
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 1888 SHORT, A., 14, Melody Road, East Hill, Wandsworth, S.W. *l.*  
 1890 SMITH, WM., 6, Buchanan Terrace, Paisley. *l.*  
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 1882 SOUTH, R., F.E.S., *President*, 100, Ritherdon Road, Upper  
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 1873 STANDEN, R., F.L.S., F.E.S., Thorpe Hall, Colchester. (*Life*  
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 1872 STEP, E., F.L.S., Portscatho, Cornwall, *b, m, orn.*  
 1892 STEPHENS, A. L., Ash's Farm, Cramborne, near Salisbury.  
 1872 STEVENS, S., F.L.S., F.E.S., Loanda, Beulah Hill, Norwood,  
 S.E. *l.*  
 1889 STURT, W. T., West House, Queen's Road, Kingston Hill. *l.*
- 1894 TARBAT, Rev. J. E., The Common, Weybridge. *l.*  
 1895 THORNHILL, W. B., Castle Cosey, Castle Bellingham, near  
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 1895 TOLHURST, J., "Glenbrook," Beckenham, Kent. *l.*  
 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l.*  
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- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Park, Black-  
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- 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d.*
- 1889 VINE, A. C., 38, Temple Street, Brighton, Sussex. *l.*
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- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., 23, Ranelagh Road, Marine  
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- 1890 WALLACE, G., 6, Borough High Street, S.E. *l.*
- 1888 WALLER, R., 273, Clapham Road, S.W. *l.*
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- 1890 WARD, A., 66, Richmond Road, Brighton. *l.*
- 1888 WARNE, N. D., 8, Bedford Square, W. *l.*
- 1888 WARNE, W. F., 8, Bedford Square, W. *l.*
- 1887 WATERHOUSE, E. A., 23, Spencer Road, Putney, S.W.
- 1896 WATERS, A. H., B.A., 48, Devonshire Road, Cambridge. *l. m.*
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- 1888 WEBB, S., Folkestone Road, Dover. *l.*
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road,  
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- 1878 WEST, W., L.D.S., Cyprus Villa, Lewin Road, Streatham  
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- 1895 WOOD, H. L., The Old Grammar School House, Ashford,  
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- 1886 WRIGHT, W. H., Secretary's Department, Somerset House  
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- 1888 YOUNG, J. N., 85, FitzWilliam Road, Rotherham. *l.*

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(ESTABLISHED 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.



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HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

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The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invites the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting Specimens.

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## SUBSCRIPTION.

*Seven Shillings and Sixpence per Annum, with an Entrance  
Fee of Two Shillings and Sixpence.*

All Communications to be addressed to the Hon. Gen. Secretary,  
S. EDWARDS, F.L.S., F.E.S., etc.,  
Kidbrook Lodge, Blackheath, S.E.

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## PAST PRESIDENTS.

1872 ... J. R. WELLMAN.	1885 ... R. SOUTH, F.E.S.
1873 ... "	1886 ... R. ADKIN, F.E.S.
1874 ... "	1887 ... "
1875 ... A. B. FARN.	1888 ... T. R. BILLUPS, F.E.S.
1876 ... "	1889 ... "
1877 ... J. P. BARRETT.	1890 ... J. T. CARRINGTON, F.L.S.
1878 ... J. T. WILLIAMS.	1891 ... W. H. TUGWELL, Ph.C.
1879 ... R. STANDEN, F.E.S.	1892 ... C. G. BARRETT, F.E.S.
1880 ... A. FICKLIN.	1893 ... J. J. WEIR, F.L.S., etc.
1881 ... V. R. PERKINS, F.E.S.	1894 ... E. STEP, F.L.S.
1882 ... T. R. BILLUPS, F.E.S.	1895 ... T. W. HALL, F.E.S.
1883 ... J. R. WELLMAN.	1896 ... R. SOUTH, F.E.S.
1884 ... W. WEST, L.D.S.	

## REPORT OF THE COUNCIL, 1896.

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THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-Fourth Annual Report to the Members, is pleased to be able to state that the affairs of the Society continue in a satisfactory condition. The membership, it is true, has not increased in numbers, the twelve new Members elected being more than counterbalanced by the six retirements, seven names removed from the books for non-payment of subscriptions, two elections becoming void under Bye-law viii., sec. 1, and the lamented death of our esteemed Member, Mr. J. A. Cooper; thus leaving the present membership at 176, consisting of 113 ordinary at the 7*s.* 6*d.* subscription, 7 at 6*s.*, 15 country at 5*s.* and 31 at 2*s.* 6*d.*, 5 life and 5 honorary, as compared with a total of 180 at this time last year.

But whereas a net decrease in numbers is always to be regretted, it will be noticed that a large proportion of the numerical loss is in the names removed from the books by the Council in the exercise of its discretion under Bye-law x., sec. 2—names of Members who, it goes without saying, have been utterly inactive for some considerable time past, and who are therefore no real loss to the Society; and the Council fully believes that the effective strength of the Society is quite equal to, if not actually in advance of, what it was at the time of the last Annual Report. The Council wish, however, to take this opportunity of impressing upon the Members, collectively and individually, the desirability of introducing their friends, with a view to their embracing the manifold advantages which this Society has to offer.

The finances of the Society continue on a sound basis, the credit balances under each heading showing an increase over

those of the previous year, as will be seen by the balance-sheet.

During the summer months three Field Meetings were held, namely :—On Whit Monday, May 25th, at *Brockenhurst* and district, under the leadership of Mr. STANLEY EDWARDS. Accommodation was provided for the convenience of those Members who were able to leave town on the previous Friday, of which several availed themselves, and others joined the party on the Monday. On Saturday, June 20th, at *Byfleet*, and along the banks of the *Basingstoke Canal*, conducted by the Rev. J. E. TARBAT. And on Saturday, July 18th, at *Chalfont Road* and the adjoining beechwoods, under the leadership of Mr. R. SOUTH. (A special report of this Meeting is printed with the papers at the end of this volume). The Council desires to tender its thanks to the gentlemen who acted as conductors on these occasions, whose care in carrying out the arrangements conduced so much to the success of these most enjoyable and instructive Meetings.

Of the ten original papers which have been read during the year, four were contributed by Mr. ADKIN, two by Mr. TUTT, and one each by Messrs. BILLUPS, MANSBRIDGE, SOUTH, and TURNER. The majority of them deal with matters of scientific interest, and it is hoped will be printed in full with this volume. In addition to these, Mr. F. ENOCK gave an exceedingly interesting lecture, illustrated with the oxy-hydrogen lantern, on the life-history of *Cicendela campestris*; and Mr. BARRETT introduced a discussion on the genus *Dianthæcia*, which latter is briefly reported in the "Abstract of Proceedings."

The attendance and exhibits, as well as the general interest manifested in the proceedings, at the ordinary Meetings have been quite up to the average. A novel feature was introduced by one of the Meetings being specially set apart for the exhibition of varieties, and both the exhibits and attendance were fully up to the Council's most sanguine expectations.

The "Abstract of Proceedings" for 1895 was published



during the year, and contained, besides the reports of Meetings and other usual information, several important papers, making in all a volume of 107 pages.

The post of Librarian, which has been so ably filled by Mr. H. J. TURNER during the past five years, becomes vacant by his retirement from that office, and the Council congratulates itself on having secured the services of a worthy successor in Mr. H. A. SAUZÉ, in whose ability for the post they have every confidence.

It has been suggested that a catalogue of the Society's Library should be published. Seven years have elapsed since the last appeared, it being printed in the "Abstract of Proceedings" for 1889; many valuable and useful books have been added during the time, and the Council therefore hopes to give this matter its early and favorable consideration.

The Society's Album has been enriched by the addition of some dozen photographs of Members, whose good example, it is hoped, may be promptly followed by many others.

The addition to the Society's collections of the "Tugwell" Herbarium, through the kindness of the donor, Mr. C. A. BRIGGS, deserves special mention. And for additions to the Lepidoptera collection the Members are indebted to Col. PARTRIDGE for a very large number of Tortrices and Tineina; to Mr. FREMLIN for specimens of *Phorodesma smaragdaria*, and to Mr. MARSDEN for representatives of *Lycæna arion*.

The Society is also indebted to the following donors for the valuable additions to the Library mentioned below:—

"The Entomologist" for 1896, from Mr. R. SOUTH.

"The Zoologist" for 1896, from Mr. NEWMAN.

"The Entomologist's Monthly Magazine" for 1896, from Mr. McLACHLAN.

"Science Gossip" for 1896, from Mr. CARRINGTON.

"*Agrotis tritici*" (Tutt in "Canadian Entomologist").

"The Entomologist's Record," Vol. VII., "British Moths," by J. W. Tutt, "Chats on British Birds," by J. W. Tutt, and "British Butterflies," by J. W. Tutt, from Mr. TUTT.

"By Tangled Paths," by H. Mead Briggs, from Mr. C. A. BRIGGS.

"Address to the Entomological Society," by Prof. Meldola, from Mr. HY. J. TURNER.

"British Flies," Vol. I., Theobald, and "Catalogue of the Library of the Ent. Soc. of Lond.," from Mr. C. G. BARRETT.

"British Hemiptera," Saunders, "Freshwater Algæ," M. C. Cooke, and "Aculeate Hymenoptera," Saunders, from Mr. WINKLEY.

"Cambridge Natural History," Vol. V., from Mr. STANLEY EDWARDS.

"Report of the Microscopical Society of Calcutta," from Mr. MILES.

"Transactions of the City of London Entomological Society," 1895, from the SOCIETY.

"Report of the Holmesdale Natural History Society," 1892-5, from the SOCIETY.

"Report of the Entomological Society of Ontario," 1895, from Mr. GIBB.

"Life of Kirby," and "Exotic Ferns," Moore, from Mr. WEST (Greenwich).

"By the Deep Sea," Step, from the AUTHOR.

"Royal Natural History," Vol. VI., "Garden and Greenhouse Flowers," Step, from Messrs. W. F. and N. D. WARNE.

In concluding the Report, the Council desires to express

its thanks to all those Members who, during the year, have rendered much valuable assistance by making additions to the Library and collections, in aiding in the production of the volume of the "Abstract of Proceedings," and in many other ways that have greatly conduced to the efficient carrying on of the general business of the Society.

# THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

## BALANCE SHEET FOR THE YEAR 1896.

### GENERAL FUND.

<i>Receipts.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>	<i>Expenditure.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
To Balance in Hand ...	...	12	5	4	By Rent (1 year to Christmas, 1896) ...	25	0
" Subscriptions received, 98 at 7/6 ...	36	15	0	" Attendance (1 year to 31st Dec., 1896) ...	2	10	0
" " " 5 " 6/- ...	1	10	0	" Printing ...	2	4	6
" " " 10 " 5/- ...	2	10	0	" " Postage, Stationery, and Sundries ...	5	8	0
" " " 25 " 2/6 ...	3	2	6	" Insurance of Library and Collections (Fire)	8	3	
" " " on a/c of 1897	43	17	6	" Entrance Fees carried to Suspense a/c	...	...	8
" Entrance Fees, 12 at 2/6 ...	...	0	17	" " Vote to Library Fund	...	...	1
" Arrears of Subscriptions received ...	...	1	10	" " Vote to Publication Fund	...	...	1
	...	10	1	" " Balance in Hand	...	...	12
							5
							4
							3
							3
							9
							0
							0
							4
							3
							3
							4
							4

### SUSPENSE ACCOUNT.

<i>Receipts.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>	<i>Expenditure.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
To Balance in Hand ...	...	5	5	0	By Balance in Hand ...	...	...
" Entrance Fees from General Fund...	...	1	10	0			6
							15
							0



# LIBRARY FUND.

<i>Receipts.</i>	<i>£ s. d.</i>		<i>Expenditure.</i>	<i>£ s. d.</i>
To Balance in Hand	...	By Binding Books	...	...
" Vote from General Fund	...	" Balance in Hand	...	...
" Library Fines	...		...	...
	<u>£1 8 3</u>			<u>£1 8 3</u>

# PUBLICATION FUND.

<i>Receipts.</i>	<i>£ s. d.</i>		<i>Expenditure.</i>	<i>£ s. d.</i>
To Balance in Hand	...	By Printing	...	...
" Vote from General Fund	...	" Balance in Hand	...	...
" Donations	...		...	...
" Sale of "Proceedings"	...		...	...
	<u>£30 2 1</u>			<u>£30 2 1</u>

# ASSETS & LIABILITIES.

<i>Assets.</i>	<i>£ s. d.</i>	<i>Liabilities.</i>	<i>£ s. d.</i>
To Balance, General Fund	...	By Rent, Outstanding Accounts, etc.	...
" " Suspense Account...	...	" Balance in Hand	...
" " Library Fund	...		...
" " Publication Fund...	...		...
" Arrears of Subscriptions, £15 15s., valued at say...	<u>27 8 1</u>		
	<u>6 0 0</u>		
	<u>£33 8 1</u>		<u>£33 8 1</u>

Examined, compared with Books and Vouchers, and found correct, *January 25th, 1897.*

THOS. WM. HALL,  
H. S. FREMLIN, } *Auditors.*

## THE PRESIDENT'S ADDRESS.

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GENTLEMEN,

At the termination of his period of office it has been customary for each retiring President to say a few words before vacating the Chair. I have great pleasure in conforming to the established rule.

Our Society continues to flourish, and regarded from a financial point of view may be said to be thoroughly sound. Some twelve or thirteen years ago we were in a very low state, and it was thought that a change of residence would be beneficial, so we removed from a chapel or school-room, first to a coffee-palace, then to an auction-room, once more to an hotel, and finally to our present commodious habitation. I think it may be said that we commenced to improve soon after our first change of abode had been effected; however, it is certain that each subsequent change resulted in an accession of vigour, until at the present time we may boast of being about as robust as at any time during our career.

The Society's collections, which still continue under the able care of Mr. W. West, have been considerably enriched by the addition of the valuable Herbarium formed by the late Mr. W. H. Tugwell, and presented to us by Mr. C. A. Briggs, to whom we are much indebted for this very appropriate memento of our late member and past President.

Instead of an Exhibition, which we have held more or less annually for a series of years, we had in 1896 an evening set apart for exhibiting varieties. This was a great success from every point of view, and your Council may probably arrange for similar exhibitions in future years.

Mr. Enock's instructive lecture on the life-history of *Cicendela campestris*, which was illustrated by lantern slides prepared by the lecturer, was largely attended. It is really most kind of Mr. Enock to help us in this manner, and I am sure that we all feel deeply obliged to him.

Mr. Fred Clark has also brought our lantern into use

during the year, showing us some excellent photo-micrographic slides of structural details of insects. These were prepared from material supplied to him by members of the Society.

Ten papers have been read at our meetings during the year; but this total is hardly to be considered as good as it should be when we look at the number of active workers there are in our Society. When I venture to say that I think those papers that occupy about fifteen or twenty minutes in reading offer certain advantages over longer ones, I hope it will not for a moment be thought that I desire conditions should be imposed on authors as to the length of their papers. With short papers we have time for discussion, and there is also opportunity to exhibit specimens in the earlier part of the evening.

A number of highly interesting specimens have been brought under our notice during the session, and the remarks made thereon, and the occasional discussions, were of a most instructive character. The plan of members exhibiting their series of the species of a particular genus on the same evening is an excellent one, as it enables us to extend our knowledge of the variation of the species under review. An opportunity is also afforded for debating certain points in connection with the species, as was the case when Mr. Barrett introduced the genus *Dianthæcia*.

In view of the large number of aberrations of the more highly variable species that have been named it would perhaps be a good idea to take each of those species in turn, and ask members to exhibit all the forms of that species that they could determine. By this means we might obtain some additional knowledge of the distribution of the varieties, and at the same time we should, perhaps, be able to rectify any mistakes that might have occurred in identification.

With regard to discussion, it is perhaps hardly necessary to observe that neither in controversy nor debate should matters of fact be treated as subordinate to preconceived opinion. Neither should we endeavour to pervert issues by specious argument.

Whatever estimate we may hold of our own ability to put straight that which we may consider awry, we exceed our power when we attempt to ride rough-shod over the convictions of others, and endeavour to force our opinions upon them. We should remember that it is not by mere verbosity and a liberal use of the first person singular that

we are most likely to convince others of our being right, and of their being wrong. As the old saying has it, "A man convinced against his will remains of the same opinion still."

Difference of opinion leads to discussion, but the legitimate outcome of argument should be elucidation of the matter in question, and establishment of the truth. In the consideration of any subject of a scientific character it is certainly only right to point out error wherever detected. At the same time, however, the ordinary courtesies of debate oblige us to treat the opinions of others with respect. Those who make statements, or bring forward theories, are understood to do so in all sincerity. If such theories or statements are not quite in accordance with our views, we should present the facts upon which we base our opposition in an orderly and concise manner. To essay the overthrow of an opponent by a flood of sarcastic criticism and personal invective is altogether unseemly, and quite out of place either in writing or speaking on subjects pertaining to science. Such style of argument may "tickle the ears of the groundlings," but will not fail to be offensive to all who consider that the discussion of scientific questions should be conducted in earnestness.

My predecessor in the Chair, Mr. Hall, in his address to you last year, adverted to the possible advantages of a combination of Natural History Societies of the Metropolis. Although I recognise that amalgamation would be distinctly advantageous from certain points of view, I am not prepared to admit that it would be an altogether unmixed blessing. It is to be hoped that every member of this Society realises the fact that union is strength, in so far as it concerns the cohesion of the component parts of the Society. We are enrolled as fellow-workers in the extensive field of natural history, and although we may individually affect different branches of study, there is, I am sure, complete sympathy between us all. Let us be firm in the resolve to be true to each other, and each one of us steadfast in endeavouring to do all that he can to further the best interests of the Society. If we continue to be united in purpose, and work harmoniously together in carrying out the object of our association, we may be sure of increasing our numerical strength, and still further improving our position as time rolls on.

It is little short of humiliating to every true student of nature that there should be any necessity to seriously consider the question of how local butterflies and moths are to



be protected from threatened extermination. It would appear, however, that unless something is done in the very near future, certain of our rarer species of Lepidoptera will become extinct in this country. A movement in this direction has been originated by the Entomological Society of London, and there is every evidence of the matter being vigorously proceeded with. It is only reasonable to assume that every entomologist will assist as far as he can in preventing the capture of unreasonable numbers of any local species. As a matter of fact, it seems desirable that all such species should be allowed to remain unmolested for a year or two; but this is, perhaps, too much to ask.

During the last year or two extraordinary activity has been displayed in the production of works on Natural History. The inference, therefore, is that there is a demand for this class of literature, and if this be so we must suppose that Natural History subjects find favour among a much larger number of the public than used to be the case. Our societies ought to have evidence of the fact very soon in the shape of numerous candidates for admission.

A large proportion of the books brought out are sound, useful works, and are sure to obtain recognition. Some, however, are practically useless, and one feels inclined to lament that so much labour should have been expended on them; others have evidently been prepared rather as books for the day than as permanent additions to the literature of the subject on which they treat.

Among those issued during 1896, the following are especially commended to your attention:

#### **General subject.**

"Textbook of Zoology," by J. E. V. Boas. Translated by J. W. Kirkaldy.

"The Royal Natural History." Edited by Richard Lydekker.

"The Cambridge Natural History." Edited by S. F. Harmer and A. E. Shipley. Vol. II. Treats of Worms, Rotifers, and Polyzoa.

#### **Ornithology.**

"A Handbook of the Birds of Great Britain," by R. Bowdler Sharpe.

"A Concise Handbook of British Birds," by H. Kirke Swann.

"British Birds, their Nests and Eggs," by Arthur G.

Butler and others. Illustrated by F. W. Frohawk. Issued in monthly parts.

"The Evolution of Bird Song: with Observations on the Influences of Heredity and Imitation," by Charles A. Wittchell.

### **Mollusca.**

"A Monograph of the Land and Freshwater Mollusca of the British Isles," by John W. Taylor. Issued in parts at rather long intervals.

"The Collector's Manual of British Land and Freshwater Shells," by Lionel Ernest Adams. Second edition.

### **Botany.**

"The Student's Handbook of British Mosses," by H. N. Dixon.

### **Entomology.**

"A Handbook of the Order Lepidoptera," by W. F. Kirby. Some changes in the nomenclature of British butterflies will be found in this work.

"British and European Butterflies and Moths," by A. W. Kappel and W. Egmont Kirby.

"British Butterflies" and "British Moths." Both by J. W. Tutt. There are many changes in generic nomenclature in both of these volumes.

"The Crambidæ of North America," by C. H. Fernald. A number of British species are dealt with.

"The Gypsy Moth (*Porthetria dispar*, L.)," by J. H. Forbush and C. H. Fernald. An exhaustive account of the species, both in the Old World and the New; but dealing more particularly with the injury effected by it in Massachusetts, and the means adopted for endeavouring to exterminate the pest.

"Handbuch der paläarktischen Gross-Schmetterlings für Forscher und Sammler," von Dr. M. Standfuss.

"British Lepidoptera," by C. G. Barrett. Vol. III. Comprises Bombycidæ, commencing with Family 10, and a part of the Noctuæ.

"Hymenoptera-Aculeata of the British Islands," by Edward Saunders.

"Hemiptera-Homoptera of the British Islands." by James Edwards. A descriptive catalogue of the Cicadina and Psyllina.

"Economic Entomology," by John B. Smith. Prepared

more especially as a textbook for farmers and fruit-growers in the United States of America; but the work comprises a great deal that should be interesting to the general entomologist.

Every one interested in the more or less common objects of the sea-shore will do well to obtain a little work entitled "By the Deep Sea," written by Edward Step.

Considered as a whole, the entomological season of 1896 does not appear to have yielded any event of unusual interest, except, perhaps, the occurrence of several melanic varieties of *Limenitis sibylla* in the New Forest, and the re-discovery of *Lasiocampa ilicifolia* on Cannock Chase.

Certain species were abnormally early, and some, especially members of the Lycanidæ, were exceptionally abundant. Only seventeen species of insects new to Britain have been detected, and these comprise six Coleoptera, two Diptera, two Hemiptera, two Hymenoptera, and five Lepidoptera.

#### ADDITIONS TO THE LIST OF BRITISH INSECTS, 1896.

##### **Coleoptera.**

*Epuræa nana*, Reitt. "Ent. Mo. Mag.," (2) vii., p. 4.

*Palorus ratzeburgi*, Wissm. "Ent. Mo. Mag.," (2) vii., p. 28.

*Palorus subdepressus*, Woll. "Ent. Mo. Mag.," (2) vii., p. 28.

*Quedius riparius*, Kellner. "Ent. Mo. Mag.," (2) vii., p. 80.

*Amara famelica*, Zimm. "Ent. Mo. Mag.," (2) vii., p. 97.

*Anisodactylus nemorivagus*, Zimm. "Ent. Mo. Mag.," (2) vii., p. 253.

##### **Diptera.**

*Pogonota hircus*, Zitt. "Ent. Mo. Mag.," (2) vii., p. 87.

*Xysta (Phasia) cana*, Mg. "Ent. Mo. Mag.," (2) vii., p. 212.

##### **Hemiptera.**

*Lecanopsis brevicornis*, Newstead. "Ent. Mo. Mag.," (2) vii., p. 59.

*Aspidiotus hederæ*, Vallot. "Ent. Mo. Mag.," (2) vii., p. 279.

##### **Hymenoptera.**

*Hedychridium integrum*, Dhlb. "Ent. Mo. Mag.," (2) vii., p. 121.

*Chrysis osmiæ*, Thoms. "Ent. Mo. Mag.," (2) vii., p. 123.

##### **Lepidoptera.**

*Argyresthia atmoriella*, Bankes. "Ent. Mo. Mag.," (2) vii., p. 25.

*Leucania favicolor*, Barr. "Ent. Mo. Mag.," (2) vii., p. 100.  
*Coleophora glitzella*, Hfmn. "Ent. Mo. Mag.," (2) vii.,  
 p. 145.

*Gelechia suppeliiella*, Wlsm. "Ent. Mo. Mag.," (2) vii.,  
 p. 250.

*Calophasia platyptera*, Esp. "Science Gossip," 1896,  
 pp. 131—141; "Entom.," xxix., 319.

*Epurea nana* was taken by sweeping herbage in the neighbourhood of Thorpe-le-Soken, Essex, at the end of August. Mr. Champion, who records this species, says that it is smaller than its nearest ally, *E. melina*, Er. Mr. Champion also informs Coleopterists that *Palorus depressus*, Fabr., does not occur in this country; but that the British specimens we have been in the habit of referring to that species are really either *P. ratzeburgi* or *P. subdepressus*, both of which occur here in granaries, bakehouses, etc.; but the last named is the least abundant. Mr. Blatch discovered *Quedius riparius*, in March last, at Porlock, and he suggests that this British novelty may probably occur on the margins of quick-flowing streams throughout the Exmoor district. A species of *Amara*, previously supposed to be a form of *A. spreta*, Dej., proves to be *A. famelica*, and therefore an addition to the British list. It occurs at Woking and Cobham, and is found in autumn and spring in sandy places or heaths. Mr. Champion, who brings forward the last-named species, also calls attention to the fact that the insect known in England as *Anisodactylus* (*Harpalus*) *atricornis*, Steph., is not a form of *A. binotatus*, but a variety of *A. nemorivagus*.

By sweeping rushes at Blackroot Pool, Sutton Park, in June, Mr. Bradley secured *Pogonota hircus*, a Dipteron new to our list; and Mr. Moseley, while brushing for Coleoptera in May, obtained *Xysta cana*, also an addition to British Diptera.

In Hemiptera we have two Coccids, introduced by Mr. Newstead, one of which is new to science. Two species are also added to the British Hymenoptera, viz. *Hedychridium integrum*, previously confounded in Britain with *H. ardens*, Coq. (= *minutum*, Lep.); and *Chrysis osmiæ*, also hitherto mixed up with allied species.

Mr. Barrett introduces a *Leucania*, which he considers to be new to science, and bestows upon it the name *favicolor*. A male and three female specimens were obtained by Mr. Mathew on the Suffolk and Essex coast in July. In a



subsequent note ("E. M. M.," 2nd series, vol. vii., p. 261) Mr. Mathew records seven other specimens, and states that if he had not been called away just at the time he would probably have taken more examples of the species. *Calophasia platyptera*, a Noctuid moth new to the British list, has been recorded by Mr. Carrington. The specimen, which is a male, was found near Brighton by the recorder, who was at the time engaged in looking for Mollusca rather than Lepidoptera.

*Argyresthia atmoriella*, a species described by Mr. Banks, was beaten out of larch trees near King's Lynn, in June, by Mr. Atmore; *Coleophora glitzella*—although this species was first bred in 1884 from larvæ found on *Vaccinium vitis-idaea* in the spring of that year, its occurrence in Britain remained unannounced until 1896; *Gelechia supeliella*, a new species named and described by Lord Walsingham, who points out its distinction from *G. peliella*, the species for which it has long been mistaken—these are all that are new in Microlepidoptera for the year.

A remarkable and at the same time exceedingly satisfactory indication of the changes in progress is the great interest British entomologists are taking in the study of that larger insect fauna, of which the species occurring in these islands constitute but a very insignificant moiety. Quite a number of lepidopterists now spend a portion of each year in collecting on the Continent of Europe, or in other places where they can extend their practical knowledge of Palæarctic Lepidoptera.

Among other results accruing from these periodical excursions of the English entomologist into foreign lands is the degradation of species; several have already been reduced, and the specific rank of others is challenged, so that it is quite possible that before long we may cause our *confrères* abroad to be as much astonished at what they may probably consider our effrontery in presuming to teach them entomology, as they certainly have been at our conservatism in the past. No doubt it will at first appear novel to have Englishmen among them elevating varieties to specific rank, and reducing time-honoured species to mere varieties by a kind of intuitive process; but the foreign entomologist may be depended on to see that the existing state of things is not unreasonably disturbed. It may surely be predicted that before many more years have run their course the majority of entomologists in this country will have ceased to regard Continental specimens of Lepidoptera as unworthy of their

attention, whether they include such examples in their collections of British insects or not. The value of a collection of purely insular specimens is in no way diminished because we happen to possess a collection of foreign specimens also.

Closely connected with the wider interest home collectors are taking in European species and specimens is the matter of setting. Should the system that obtains everywhere outside these islands be adopted? is a question which many entomologists in this country answer in the affirmative. Does anyone now set out his insects by means of paper braces above and below the wings, as used to be done before saddles or setting-boards were invented? So long as the method of setting we have been accustomed to answers our purpose we shall probably continue to use it; but directly we find that it impedes progress in any direction we wish to go, we shall employ any other system that promises to assist us in attaining our desires. No doubt the old brace arrangement was a long time in going out of fashion, if it really has entirely gone out, and it is equally without doubt that the "saddle" will be slow in retiring to make room for the "high set." Probably, however, we may assume that the saddle will be superseded in the course of time.

The variation of species has always been a subject of interest to many lepidopterists, but during the last few years it has received a larger amount of attention than was previously accorded it. Not only have the various mutations in a species range of variation been discussed in considerable detail, but a large number of the forms have been furnished with varietal names. Entomologists are not at all in unison with regard to the naming of all the more or less unimportant aberrations of a species, but there is little difference of opinion concerning well-defined varieties. In the case of a local race we have a form with special characters clearly distinguishing it from the type, and it is therefore entitled to rank as a sub-species. Application of the trinomial system beyond these limits involves the whole matter in complexity. The practice may possibly not be without advantages when monographing an entire group of Lepidoptera, but even then it is apt to be overdone. The great difficulty is when varietal names are published in works that are not consulted by entomologists generally. If it is considered to be really necessary that a certain form of a species should have a distinctive name, it is surely only reasonable to suppose that

means would be taken to make the fact as widely known as possible. Reference has already been made to the fact that many English entomologists now collect Lepidoptera on the Continent. It may also be added that some of our brethren abroad are interested in our species, more especially the polymorphic ones. Possibly we may some day learn as much about the distribution of the varieties of our species as we now know about that of the species themselves. There are some forms, it may be mentioned, which seem to be purely insular, as, so far as we know, they are not found on the Continent.

According to the value they attach to details of structure as characters of generic importance, some systematists merge several genera into one, whilst others not only adopt every genus which has been formed and comes within their province, but find it necessary to create new genera in addition. Of the works on British Lepidoptera recently published, the three of most importance differ materially in systematic arrangement, and also in nomenclature. In one the genera are not greatly different from what we have been accustomed to; in the second, almost everything in the way of arrangement is altered; whilst in the third there are some striking innovations. As each of these books will probably be studied by those interested in the subject, and one of the three be adopted as a standard, it seems likely that some confusion may arise in the matter of names, more especially as regards genera perhaps. This difficulty, however, will probably be soon overcome, as every one will have learned to know their species by their various aliases.

Structural details would seem to offer exceedingly satisfactory characters on which to base a system of classification of Lepidoptera. The majority of these are not difficult to make out, and when their position and appearance is definitely ascertained and clearly understood there is little trouble in the matter.

In his recent arrangement of the British species, Mr. Meyrick has divided moths and butterflies into nine groups, each group differentiated by some peculiarity of neurulation. The groups are again divided into families, also according to neurulation. In the generic divisions, however, what may be termed old-time characters play an important part. Among these the head with its organs, the labial palpi, the antennæ, and the eyes are of no mean value, while the abdomen, with the thorax and the legs, have due consideration paid to them. Apart from neurulation, the wings often exhibit

characters which are useful for family or generic division. These are the frenulum, a bristle found on the under-side of the hind wings; the point of this, when the wings are in position for flying, is held in place by a catch-like process, called the retinaculum, on the fore-wing.

Then there is a more or less circular depression found on the under-side of the fore-wing of the male. It is known as a fovea, and is placed below the median nervure. This structure may be well observed in *Boarmia repandata*.

The males of some species have a tuft of long hairs on the under-side of fore-wing, or towards anal angle of hind wings; others have a lobe at base of hind wing, and the abdominal margin is aborted to a greater or lesser degree.

Although it completely upsets our old ideas, there is, perhaps, not much to object to in the composition of the first two groups in the new classification; but it is possible that the sequence of the families and genera in these groups, and also the arrangement of the first three groups themselves, will not be generally accepted.

Granted that the Lepidoptera are descended from the Trichoptera, and that Micropterygina is the ancient group from which all other Lepidoptera have been evolved, we ought still to wait for further light to be derived from thorough and critical examination of the earlier stages of Lepidoptera before we can consider that the phylogeny of either groups, families, or genera is fully demonstrated, or a system of arrangement likely to remain unaltered been devised.

Mr. Meyrick's system is undoubtedly a great advance upon the old one, and his conclusions appear to be quite consistent with the facts dealt with. The question is, are those facts sufficient in themselves for the purpose he has used them?

There has been a good deal of correspondence during the year in the matter of "Collector v. Entomologist." It certainly seems somewhat authoritative for anyone to state that people who form collections of insects, and do not make use of the material acquired for the purpose of clearing up some biological question, are unworthy of the name of entomologist. Of course, it will be readily admitted that there is a good deal more in entomology, as a science, than merely collecting and describing insects; but still, at the same time, it may very justly be contended that one may be an entomologist although one does not go very



deeply into the morphology of the subject, and perhaps almost entirely ignores its physiological aspect.

Recognising that solutions of some of the more complex problems of biology might be arrived at through entomology, some of the leading scientific men of the day turned their attention to the investigation of insect life, and this department of the study, which is largely philosophical, has attracted many students. Of course, theory, more or less speculative, largely obtains; but exception cannot be taken to this, as many, perhaps it might be said most, of the now generally accepted facts in science, were each, once on a time, known as Mr. So and So's theory.

Some students of philosophical entomology have, unfortunately, not hesitated to express a want of sympathy, not only with the field-worker or collector, but also with the describer of species. Curiously, however, they seem to have overlooked the fact that both the classes of entomologists they affect to condemn have conjointly been the means of bringing together and preparing in intelligible form the very material that is most useful to them for their work.

Without entering very far into the philosophical phase of his subject, every practical entomologist has it in his power to contribute something towards solving one or the other of the problems connected with variation, heredity, and the general laws operating in the production of species. He is already expert at rearing insects from the egg; let him continue to do this, but let him conduct his rearing operations on experimental lines. It would be a comparatively easy matter to make observations relative to the proportions of a brood favouring the known parents of that brood. As a rule, perhaps the female only is positively known; but even in such cases statistics of variation in the progeny would be interesting, and especially so if the female was of a more or less striking form.

A useful course of experimental work would be to endeavour to develop some particular varietal tendency exhibited by a species. We all know that in most, if not all, polymorphic species of Lepidoptera there are light and dark forms. Now it is quite possible that by judicious selection of a stock and careful manipulation of the subsequent broods, an entirely light or dark race might be established of any species in which the initial stage of the required variation was shown. In starting an experiment of this nature the first thing to do would be to secure ova from three or four females varying

in the direction we desire. On the emergence of the imagines it would then be necessary to remove from the main breeding-cage into an adjoining one all the specimens that did not fall in line with what we required in the way of variation. Of course, with species the sexes of which paired freely, it would suffice to remove well-matched pairs into separate cages, and in this way the object in view would probably be more quickly attained.

By eliminating varieties we do not want we are only acting as nature herself would do in the production of a local form. As a general rule it may be taken that the form of a species which best harmonises with its surroundings is protected, and as a consequence continues to flourish, whilst the less favoured forms disappear.

It should not be understood that the protective form is entirely secure, for such is probably not the case. Neither must it be supposed that the other forms all fall victims to their enemies. By the action of heredity, or the law of inheritance, varietal characters of the parent are transmitted to the offspring; it seems reasonable, therefore, to infer that the protected form once having become dominant would, in the course of time, become the only one. The means of testing the validity of this inference is in your hands, and it is to be hoped that some of you may be willing to take up the matter.

The larvæ of some species of Heterocera vary almost or quite as much as do the perfect insects, and this fact is probably well known to every one who has collected larvæ of such species as *Noctua festiva* and *Boarmia repandata* for example, in any number. Probably individuals of the same brood do not exhibit any considerable amount of difference one from another; but they may be very different from the individuals of another brood, although both broods may have been obtained from females taken in the same locality. This is another matter that the rearer of Lepidoptera could easily investigate, and it would add great interest to the observation if comparisons were made between the larvæ at different stages of their growth.

Hybrids have been obtained by the experimental entomologist, and it is quite possible that others will yet reward further operations in this direction. Having decided on the species for the experiment, it would perhaps be a good plan to place pupæ of each in separate cages, and let them stand side by side. When the imagines appeared, the males of each might be transferred, as soon as they emerge, from

their own cage to that of the other species; so that, supposing *Spilosoma menthastri* and *S. lubricipeda* were being tried, we should have male *S. menthastri* and female *S. lubricipeda* in one cage, and male *S. lubricipeda* and female *S. menthastri* in the other. The best chance of success would probably be with closely allied species, but almost any two species that were really congeneric would be worth a trial.

Everyone unable to read the original will be greatly indebted to Mr. W. E. Nicholson for his very able translation of Dr. August Weismann's paper on "New Experiments on the Seasonal Dimorphism of Lepidoptera." This in conjunction with the previously published work of Mr. Merrifield, Dr. Standfuss, Dr. Dixey, and others, should awaken the interest of collectors and breeders of Lepidoptera, and induce them to conduct similar experiments, as the results of these might be of value. It is, perhaps, hardly necessary to add that unless the observations are most carefully made, and details noted with the utmost exactness such work would be worse than useless.

These suggestions are not put forward as at all original; but at the risk of again going over well-trodden ground, it seemed desirable, in connection with the question of "Collector v. Entomologist," to indicate a few of the ways in which the collector or practical entomologist can assist the general advancement of the science.

We have lost one member by death. JOHN ANDERSON COOPER died on April 18th, 1896, from pneumonia, in the forty-eighth year of his age. He was elected into this Society in 1884, and although he did not attend very frequently during the last year or so, he always took great interest in our affairs. Apart from his wide knowledge of British Macro-lepidoptera in their various stages, he was a good ornithologist and oologist. The majority of the birds in his collection were set up by himself, and he had amassed a splendid collection of birds' eggs, some of the series of the more variable eggs being remarkable. We have, on the occasion of our Exhibition, often been indebted to him for a fine display of objects in this department. He was exceedingly genial and kind-hearted, and as a companion in the field was both instructive and entertaining.

In conclusion, gentlemen, I have again to thank you for the honour you conferred upon me in electing me as your president. I regret that I have not been able to discharge the duties of the office as regularly as I wished to do, and I must express my obligations to the vice-presidents, Messrs.

Barrett and Hall, for so kindly conducting the meetings on those occasions when I was unable to be present.

Eleven years ago I had the pleasure of retiring from the chair in favour of my friend Mr. Robert Adkin, who again succeeds me. With this gentleman at its head our Society is certain to advance.

RICHARD SOUTH.



## ABSTRACT OF PROCEEDINGS.

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JANUARY 9th, 1896.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

Mr. F. Clarke, A.P.S., of Paddington Infirmary, was elected a member.

Mr. Carpenter exhibited a considerable number of *Colias edusa*, being a portion of a third brood. The parent was captured at Littlehampton on August 23rd, and laid 123 ova, of which no less than 113 eventually produced imagines. He stated that the last emergence was in the third week in November. The species was an exceedingly easy one to rear. Mr. Barrett remarked that it was emerging in the open during November, on the south coast, whenever the sun was sufficiently bright.

Mr. Mansbridge exhibited a series of *Hybernia marginaria*, being typical London forms from Wimbledon Common, and a long series of melanic and variegated forms from York. He stated that the latter showed the whole range of the variation of the species in Yorkshire from the banded to dark brown or purplish forms, and that there was only one spot in the neighbourhood of York where the darkest specimens were obtainable. Very occasionally a solitary melanic example was found elsewhere. At Askham Bog none but light forms occurred; at Sandburn none but banded forms. In both districts the soil was practically the same. Mr. Barrett said that the unicolorous dark form was common around Huddersfield; while at Rotherham, which was more elevated ground, only the clouded form was taken. Mr. South said that Bishop Auckland was also a locality for the dark form. Mr. Tunaley said that he had taken all the forms shown from the neighbourhood of Birmingham, but that var. *fuscata* was very local. On one bank, north-east of Birmingham, fully exposed to the prevailing south-west wind, which

would bring volumes of smoke with it, var. *fuscata* occurred in comparative abundance. During the day the ordinary pale form could be disturbed, but at night the dark forms were readily captured by the light of a lantern. It was a gravelly soil, and not at all boggy. He had also bred most of the forms shown from ova. Mr. Mansbridge said smoke could have no effect around York, as there were no factories for many miles; but no doubt in the West Riding it was a large factor in producing melanism. Mr. Tunaley instanced *Gnophos obscurata* as having melanic forms; but it was quite impossible that these could have resulted from the effect of smoky surroundings. In Somerset nearly black forms occurred resting on the partly embedded boulders, which exposure and moisture had darkened; the moths were to be disturbed by sweeping. At Freshwater he had obtained no dark forms; there the ground was scattered over with small stones, and the vegetation was exceedingly dwarf. Mr. Adkin said that he thought *G. obscurata* assimilated with the colour of the soil: at Lewes it was almost white; among heather in the New Forest it was nearly black, and in some districts brown. Mr. Barrett said that the South Wales form was unicolorous slate-grey devoid of the usual dusting.

Mr. Robert Adkin exhibited unusually strongly-marked forms of *Hybernia defoliaria*, from Abbot's Wood, Sussex.

Mr. Mera exhibited several specimens of *Agriopis aprilina*, from Elgin and Kent. The bands of the northern forms were very complete, but narrower than the more diffuse band in the southern form.

Mr. Edwards exhibited sundry forms of both sexes of *Papilio cenea*, namely:—Form 1, *P. cenea*; Form 2, *P. hippocoon*; and Form 3, *P. trophonius*, with intermediates; also *Amauris echeria*, *A. dominicanus*, and *Danaïs chrysippus*, which are mimicked respectively by the three forms of the Papilio, all from S. Africa, *Papilio meriones*, male, from Madagascar; *P. merope*, male and its female var. *niavius*, with *Amauris niavius*, which it mimics, from W. Africa; and specimens of *Diadema misippus* and *D. anthedon*, which mimic *Danaïs chrysippus* and *D. dominicanus* respectively.

Mr. Turner read a paper on the above exhibit entitled "Mimicry as Exemplified by the South African Butterfly *Papilio cenea*, and its Varieties and Allied Species."

JANUARY 23rd, 1896.

## ANNUAL GENERAL MEETING.

T. W. HALL, Esq., F.E.S., *President*, in the Chair.

The Reports of the Council and Treasurer were read, and the Officers and Council for the year were elected as under:

*President*.—Richard South, F.E.S.

*Vice-Presidents*.—C. G. Barrett, F.E.S., Thos. W. Hall, F.E.S.

*Treasurer*.—R. Adkin, F.E.S.

*Librarian*.—H. J. Turner, F.E.S.

*Curator*.—W. West.

*Hon. Secretaries*.—Stanley Edwards, F.L.S., &c. (*Corresponding*), H. J. Turner, F.E.S. (*Report*).

*Council*.—C. A. Briggs, F.E.S., J. H. Carpenter, John T. Carrington, F. W. Frohawk, F.E.S., W. Mansbridge, F.E.S., W. A. Pearce, H. A. Sauzé.

The President read his Address, and votes of thanks were unanimously passed to all the officers.

Mr. Tutt exhibited specimens of *Argynnis latona*, and contributed the following note thereon.

“On behalf of one of our country members, Mr. W. E. Butler, of Reading, I exhibit two specimens of *Argynnis latona*, sent to him by Mr. B. Stafford Chope as British. As this is one of those species, British specimens of which have a high money value, and Mr. Chope has brought himself publicly forward by writing to the “Entomologist,” Mr. Butler thinks that a record of their capture should be made.

“The first specimen was sent from Axminster, Devon, on April 3rd, 1894, with the following note. ‘I have sent you an *A. latona*, as a speciality. I only took *five* last season (they came from Roseberry Woods, near Exeter), and I hope you will admire it.’ On December 3rd, 1895, Mr. Chope, writing from 117, Queen’s Gate, S.W., offered Mr. Butler another specimen, stating, ‘I have to spare a very fair specimen of *latona*, one of *three* I took this year in Hants,’ &c. This was sent to Mr. Butler with a long letter on December 10th, in which Mr. Chope writes, ‘Re *latona*. General statements such as the one you refer to in

Mr. Barrett's new work are usually far from being correct. In that case, I may mention that I myself have taken *seven* *A. latona* in the last few years, and I know another collector (who visits the same locality as myself) who took eight this year (1895) alone.'

"Of other rarities, Mr. Chope mentions in this letter that Major Still and himself 'captured a specimen of *Lycæna bætica*,' whilst the 'courses that are being pursued at Starcross for *C. hera*, which are not at all calculated to further the best interests of entomology, and the advice of the late Mr. Tugwell,' are his reasons for not chronicling the capture of *A. cratægi*; *D. pulchella* also comes in for notice. Of course, Mr. Butler does not wish to prejudice Mr. Chope's captures, but he thinks, and you no doubt will agree with him, that captures of such a rare species as *A. latona* in Britain should be thoroughly authenticated. It would appear to be an oversight that the five specimens captured in 1894 (? 1893) and the three captured in 1895, make, according to Mr. Chope's later calculation, but seven, and it is unfortunate that both specimens are loose on their pins. I have personally written to Mr. Chope since Mr. Butler handed me his letters, but, unfortunately, can get no reply from him. One cannot help thinking that some mistake has occurred, for, speaking of a specimen of *dentina*, sent by him as *atiplicis*, he explains the mistake by supposing that 'the species must have got mixed by accident in the duplicate cabinet, which sometimes has a nasty way of being tampered with by one's friends.'"

The President read the following letter, which he had received from Mr. C. A. Briggs:—

55, Lincoln's Inn Fields, London.

January 23rd, 1896.

"My Dear Mr. Hall,—I think that you will agree with me that our Society should have some memorial of our late fellow member, Mr. Tugwell, and I am glad that at the dispersal of the remainder of his Natural History effects on Monday last I was able to secure his Herbarium, which, side by side with entomology, had been the work of his lifetime; and from the catalogue that accompanies it, is apparently an almost complete collection of British plants.

"I think that no better memorial of him could be found, and have very great pleasure in asking you, as President, to accept it for and on behalf of our Society, and add it to



the collections. I would suggest that this and any future addition should be known as 'The Tugwell Herbarium.'

"Yours sincerely,

"C. A. BRIGGS."

A unanimous vote of thanks was accorded to Mr. Briggs for this handsome addition to the Society's extensive collections.

FEBRUARY 13<sup>th</sup>, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. J. Tolhurst, J.P., Beckenham, Kent; Mr. E. Montgomery, Ealing, W.; and Mr. A. Montgomery, Ealing, W., were elected members.

Mr. McArthur exhibited a long series of *Triphæna comes* (*orbona*, Fb.), bred from larvæ collected, or from ova obtained from moths taken, in the island of Hoy, Orkney. All the specimens were intensified forms of the *curtisii* variety, the colour of the fore-wings being almost black, but the hind wings showed only slight suffusion. It was mentioned that this was the only form of the species taken in Orkney.

Mr. McArthur also exhibited a number of extinct, and rare species of Lepidoptera from the Fry collection, including several male and female specimens of *Chrysophanus dispar*; a pair of *Lasiocampa ilicifolia* from Cannock Chase; three specimens of *Abraxas grossulariata*, two of which were almost complete white and black-banded forms, the black on a part of the margins being rayed, the third specimen had a yellow tinged ground colour; the two specimens of *Notodonta bicolor*, said to have been taken at Killarney; the original British specimen of *Nyssia lapponaria*; two specimens of *Synia musculosa*, captured at Brighton; the specimen of *Hadena peregrina*, captured by Miss Meek at Lewes; three specimens of *Caradrina ambigua*, taken at Brighton by Mr. Vine; a specimen of *Xylina lambda*, var. *zinckenii*; three specimens of *Ophiodes lunaris*, one of which was a very distinctly banded variety; the original specimen of *Catocala electa*, taken by Mr. Vine at Brighton, only one other example of this species is recorded as British; a series of the rare *Eupæcilia gilvicomana*, and a specimen of *Catocala fraxini*.

Mr. R. Adkin exhibited the specimen of *Cucullia gnaphalii* bred by the late Mr. W. H. Tugwell from a Tilgate larva.

Mr. Sturt exhibited the specimens of *Sphinx convolvuli*

which he had bred in December and January from the larvæ sent him from Cornwall ("Proc.," 1895, p. 57). Mr. Tutt remarked that Mr. Sturt deserved great credit for getting his *Sphinx convolvuli* through, and he was, he believed, the first British lepidopterist who had reared the insect from the larva to the imago. Some years ago Prof. Poulton got the larva through to the pupal stage in late autumn, and proved that the insect passed the winter in that stage, although there had been more than one suggestion in the magazines since that time that *S. convolvuli* might hibernate in the imaginal stage. Mr. McArthur said that men who worked in potato fields often brought in the pupæ of *S. convolvuli*, as well as those of *A. atropos*.

Mr. Oldham exhibited specimens of *Cosmia affinis* and *Hybernia defoliaria* from Epping Forest, and a number of *Helices* from Folkestone, including *H. nemoralis*, *H. hortensis*, and *H. lapicida*. Mr. Carrington remarked that the specimens of *H. hortensis* were unusually large.

Mr. Frohawk exhibited the contents of a pheasant's crop. The bird was evidently a truly wild one, for the main contents were the larvæ of the Dipteron *Bibio marci*, L. There were in addition a few rose berries, root fibres, and small stones.

Mr. Auld exhibited a bred series of *Tortrix cratægana*, from the New Forest. The pupæ were found spun up in the leaves of buckthorn, and it was suggested that the larvæ had dropped from the overhanging oaks, upon which tree they are invariably known to feed.

Mr. Carpenter exhibited a very fine collection of *Argynnis paphia*, including a drawer of magnificent examples of the var. *valesina*; a large number of specimens had pale areas; and a male example had unusually well-developed androconia. Mr. South exhibited specimens of the same species, showing pale areas; also a number of allied species from the Palearctic region, including a very dark var. *valesina* from China (from Mr. Leach's collection).

Mr. South read a paper entitled, "Some remarks on the genus *Argynnis*, with particular reference to a certain phase of aberration observed in some species of the genus," of which the above exhibit was in illustration. (Printed page 76).

In the discussion which followed, Mr. Carrington said that he observed that all the specimens having white patches were more or less damaged. Mr. Carpenter said that such was the fact, and that he only knew of one perfect specimen, which Mr. Frohawk had taken. Mr. Frohawk said that he

had seen the typical forms attack and persistently follow these variations, just as was well known was the case with birds who persecuted any of their own species which were strikingly aberrant in colour. He also stated that *valesina* was peculiar in its habits; it was local, and much shier and more retiring than the ordinary female form, with which it did not associate.

Mr. Robinson asked what was the condition of the scales on these patches, as they appeared to him to be more or less transparent or absent. Mr. Frohawk stated that he had examined the scales under a microscope, and had found that they were present, but were without the ordinary pigment. Mr. Tutt then remarked that this statement practically gave away the whole theory propounded by Mr. South (and suggested by Mr. Frohawk), viz. that the marks were simply ancestral characters; for the allied species which had been mentioned, and in which pale marks appeared towards the costa, as pointed out by Mr. South, and which he considered were parallel to the pale patches exhibited by the male *A. paphia* to which the discussion referred, had these pale patches fully pigmented. He further considered that the irregularity in size and shape, the variation in position, and the fact that the peculiarity was sometimes extended to a whole or to a large portion of a wing, militated against the idea; while to say that the patches were reversions to ancestral characters was no explanation of the cause of the patches, which was evidently what one wished to arrive at. In every effect there was a cause, and the question was, what caused certain portions of the wing of certain *Argynnis* to develop these abnormal pale patches? Mr. Frohawk's statement that there was no pigment in the scales on these patches made the matter a purely physiological one, for it showed that the ordinary material—pigment factor, as Dr. Ridg termed it—has never been deposited in the scales. What caused the failure of this deposit? is the next question. It could not be that at some previous stage the ancestral form had had no pigment in the scales in certain portions of the wings, nor did Mr. South suggest this; but in the cases which Mr. South relied upon—the pale patches in var. *valezina* and other species—the scales forming these pale patches were thoroughly pigmented, the mature pigment-factor only producing a paler colour than the normal fulvous colour of the males of such Fritillaries as *A. paphia*. He considered that these pale patches were analogous with similar pale patches

in the Satyrids, which also were often symmetrically, often very unsymmetrically, placed on the wings. He referred to the recent researches of Schäffer and others, that the scales in the course of development went through the following stages: (1) transparent; (2) white; (3) yellow (owing to the deposit of pigment-factor from pupal blood); (4) ordinary colour of matured pigment. It would appear, then, that in these pale patches either (1) the pigment-factor has not been deposited, or (2) if deposited never got beyond stage 3 (yellow) in its development. If these arguments be logical, then we have now to consider what is the most likely explanation of this retarded scale development. Taking into account the known factors of the histolysis of the pupal tissues, he considered that anything that would cause a local weakening of the tissue would produce a result similar to that exhibited. This actual weakness of tissue might occur in the larval period, when it would naturally be carried through the pupal stage, or it might originate in the pupal stage, whilst the possible factors that might cause local weakness or disease in a larva or pupa are manifold. He further pointed out that a well-known lepidopterist had observed that when dust particles or other foreign matter interfered with the pupa when it was in the very soft stage, *i.e.* during the first hour or two following the change from the larval to the pupal condition, the result always ended in crippling the imago, or in the failure of complete scale development in the neighbourhood of the injury or irritation.

Referring to Mr. South's remarks on the sub-genera of *Argynnis*, Mr. Tutt stated that the time must now soon come when the butterflies of this country will have to be placed in their proper genera, and that we had at least three *Argynnid* genera among our species, viz.:—(1) *Dryas paphia*; (2) *Brenthis euphrosyne* and *selene*; (3) *Argynnis adippe*, *aglaia*, and, doubtfully, *latona*.

FEBRUARY 27th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. A. H. Waters, B.A., of Cambridge, and Mr. J. A. Lucas, B.A., of Kingston-on-Thames, were elected members.

Mr. Robert Adkin exhibited a series of *Hybernina leucophæaria*, representative of thirty-seven specimens taken in Abbot's Wood, Sussex, during the earlier part of the present month.



The dark-bordered and pale forms were in equal proportions, there being eighteen of each, one of the former having the central pale portion of the fore-wings almost free from the usual clouding; and of the "black" form there was one example only.

Mr. Turner said that he had found the species somewhat scarce in the London district this season, and no specimen of the black form had been seen by him.

Mr. Short exhibited a bred series of *Acronycta myricæ*, with dipterous and hymenopterous parasites. The latter were recognised by Mr. Billups as male and female specimens of *Ichneumon fuscipes*.

Mr. Dennis exhibited two living female specimens of *Vespa germanica* taken in February.

Mr. Perks exhibited two living specimens of *Rhagium inquisitor* from Epping Forest.

Mr. C. G. Barrett exhibited specimens of the resinous habitations made by the larvæ of *Retinia resinella*, together with examples of the pure resin of which they are mainly constructed, and a kind of wax secreted by the larvæ with which they are lined. ("Ent. Mo. Mag.," xxxi, p. 251.)

Mr. McArthur communicated the following observations upon *Coccyx cosmophorana* and *Retinia resinella*:

"In the Report of the Proceedings of this Society for November, 1895, by a slight error I am made to say that *Coccyx cosmophorana* did not occur at Rannoch. It is some twenty years since I first made the acquaintance of this species in that locality, and it has been recorded before and since that time in greater or lesser numbers from the same district. *Retinia resinella* is reported to have been captured in Rannoch by Bouchard, but I think erroneously, as Bouchard was known to have collected at Forres before going to Rannoch. If Bouchard had captured *R. resinella* at Rannoch, it seems very strange that so many energetic collectors, who have since visited that locality, in some cases year after year, should not have been able to find *R. resinella* in any of its stages. I mention this, for I think it will bear on the remarks I wish to make.

"During the discussion I said that I had bred *C. cosmophorana* from resinous nodules made by *R. resinella*, and that the larvæ of the former fed up on the frass made by the larvæ of the latter, and I believe I am quite correct in that statement. Mr. Tutt has taken considerable trouble to prove that I am in error, and according to the authors he quotes in his article, at first sight it would appear that my

statement was incorrect. I have no doubt that Kaltenbach is perfectly right in stating that *C. cosmophorana* makes a nodule similar to that of *R. resinella*. But I have no hesitation in saying that the larva of *C. cosmophorana*, so far as Scotland is concerned, does not feed in the way described by Kaltenbach. If *C. cosmophorana* does cause these resinous nodules to form, surely such would have been observed in the district where this species occurred. Now *R. resinella* has been searched for in the Rannoch district by many collectors who are well acquainted with its habits, and so far as I am aware without success, which proves to my mind that even in Rannoch *C. cosmophorana* feeds in a different manner from that described by Kaltenbach, otherwise the nodules would have been found and probably ascribed to *R. resinella*. So it would seem that in districts no farther apart than Rannoch and Forres the habits of the larva must be different. That the refuse in the nodules of *R. resinella* is not the normal food I am convinced. But of this I am certain, that the *C. cosmophorana* larvæ which I found at Forres were feeding on the frass in the deserted nodules made by *R. resinella*."

A long discussion ensued, Messrs. Adkin, South, Barrett, Fenn, and McArthur taking part. So far as the evidence went, it seemed probable that *C. cosmophorana* had different habits in different localities. Its actual life-history was certainly unknown. A suggestion was made that the frass of *R. resinella* was very little altered, and thus available as food for *C. cosmophorana*.

Mr. Billups read a paper on "Dipterous and Hymenopterous Parasites reared from Lepidopterous Hosts by Members of the Society during the Years 1891-2" (printed in full, pages 80-87), in which he mentioned some 480 species of parasites from 361 hosts, and exhibited a large number of parasites, with examples of the caterpillars they infested.

MARCH 12th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Col. Partridge exhibited three bred specimens of *Phigalia pedaria* (*pilosaria*) from Epping Forest; they were of a singular unicolorous grey colour with dark nervures, having thus assumed one of the characters of the dark northern form; a specimen of *Agrotis puta*, with alternate dark and pale bars, which form, Mr. Tutt said, was occasionally found;

also the specimen of *Hadena albifusa* taken by himself at Portland on August 15th, 1888. The hind wings closely resembled those of *H. trifolii* (*chenopodii*), but the fore-wings were easily distinguishable.

Mr. South exhibited several specimens of *Phigalia pedaria*, which he had bred from a black female taken last year at Macclesfield. Not a single black male had emerged, but most of the females were black. Several of the males, however, were of the same unicolorous form as those exhibited by Col. Partridge.

Mr. R. Adkin exhibited specimens and sections of the nodules of *Retinia resinella*, to illustrate remarks on the species which had been made at the previous meeting. The empty pupa cases were shown *in situ*.

Mr. Frohawk exhibited bred male and female specimens of *Nyssia lapponaria*, the latter specimen being alive. The ova were obtained from Mr. Christy, who re-discovered the species at Rannoch.

Mr. West (Greenwich) exhibited a female specimen of *Nyssia hispidaria*, taken in West Wickham Woods.

Mr. Barrett exhibited series of species of the genus *Dianthacia* from his collection, including *D. carpophaga* from Kent, Sussex, Surrey, Suffolk, and Norfolk; var. *capsophila* from Isle of Man and Ireland; and intermediate forms from the south of Scotland and South Wales; *D. luteago*, var. *barrettii*, from Howth, Ireland, and the only known specimens hitherto obtained in England and South Wales, with a Continental specimen of the type for comparison; *D. casia*, from the Isle of Man, with Continental forms for comparison; *D. albinacula* from Dover and Folkestone, with a single specimen from the old Portsmouth locality; two drawers from the cabinet of Mr. Sydney Webb, containing the same species and including the two specimens of *D. compta* which were in the late Mr. Bond's collection; also drawers from Mr. R. Adkin's collection, containing the same species.

Mr. Barrett, in the course of his remarks, observed that all the evidence known seemed to show that *D. capsophila* and *D. carpophaga* were one and the same species. He thought that there was no doubt that *D. barrettii* was but a local form of the Continental *D. luteago*. Of the occurrence of *D. compta*, he felt almost inclined to say that there never was a British specimen. The original reference by Haworth to this species described an n-like mark, which was not a character of this species, but of *D. conspersa*. Messrs. South

and Tutt also commented upon the doubtful origin of various other so-called British examples of *D. compta*. Messrs. Adkin and Tutt preferred to consider *D. carpophaga* and *D. capsophila* as two distinct but closely allied species, the latter gentleman remarking upon the extraordinary superficial resemblance and the curious parallelism in their range of variation, but stating that the consideration of their geographical distribution was sufficient to separate them. He asked if any one knew what was the structure of the tongue of *D. cucubali*, stating that it was the only species of the genus which came to sugar, and the only double-brooded species. Mr. T. W. Hall said that he always found the larvæ of *D. carpophaga* on *Lychnis vespertina*, and but few on *Silene inflata*; at the same time he generally bred a few *D. conspersa* and *D. capsicola* among the *D. carpophaga*. Mr. McArthur asked if those who had taken *D. barrettii* had noticed how quiet it was in the net, while the other species of the genus were very lively. He remarked at length upon the protective resemblances of *D. conspersa* in the various districts he had observed it. In the Shetlands, on the east of Mainland, where the rocks upon which it settles were very dark, all the specimens taken were extremely dark, and there were no intermediates. In Unst, the cliffs on the north-west were more exposed and lighter in colour; there the species was whiter, and intermediates occurred. In another limited locality, where orange-coloured lichen grew on the rocks, *D. conspersa* had yellow markings. At Brighton, where the prevailing colour was white, both of walls and chalk rocks, the species assumed its lightest coloration. The food-plant of the species was *Silene maritima*.

MARCH 26th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. A. E. Eldridge, 50, Alpha Road, Surbiton, and Mr. F. A. Bowen, 11, Buckland Crescent, Hampstead, were elected members.

Mr. F. Enoch gave, and illustrated with the lantern, an admirable and instructive lecture on "The Life-history of the Tiger beetle (*Cicendela campestris*)," being an epitome of his observations on the insect, both in nature and in confinement, during the last five years (p. 87).

Mr. Fred. Clark exhibited a number of photo-micrographic slides, some of which were prepared from specimens lent by members of the Society.



They included, amongst others, examples of insect anatomy, such as—1. Antennæ of Cockchafer and Vapourer moth (*Orgyia antiqua*). 2. Hairs of larva of Vapourer moth. 3. Fore-leg of *Dytiscus marginalis*, high and low magnifications, the former showing the suckers at the end of the trumpet-shaped tubes very clearly. 4. Portion of trachea of larva of *Dytiscus*. 5. Blow-fly, proboscis and foot. 6. Compound eye of *Hydrophilus piceus*. 7. Parasites of various kinds; concluding with a fine example of the Röntgen ray photography, the subject exhibited being a lady's hand with a needle embedded in the tissues, the eye of the needle being plainly visible.

It may be noted that when thrown upon the screen the magnification of these objects in some cases was as high as 3,000 or 4,000 diameters. The advantages of photography in thus demonstrating the minute structure of insect life are obvious when it is remembered that structure and detail are reproduced with absolute truth—detail which it would be well-nigh impossible to portray by any other method.

APRIL 9th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. Robert Adkin exhibited two specimens each of *Margarodes unionalis* and *Mecyna polygonalis*, all of which were taken by the late Mr. W. H. Tugwell, at Deal, in 1877; also an example of the latter species from the Canaries for comparison. He said the sporadic appearance of these and other species of Pyrales in various parts of the globe was a matter of very considerable interest as bearing upon the question of migration. No one, he supposed, would say that either of the above species was indigenous in this country, and indeed a comparison of the Deal and Canary specimens of *M. polygonalis* now exhibited would show the travel-stained appearance of the former. Not only did he think that the presence of these rarer species in this country was due to migration, but the occasional abundance of some of even our comparatively abundant species was due to the same cause. *Nomophila noctuella* was a case in point; often after a comparative scarcity the South Downs were infested with multitudes of worn examples of this species.

It was remarked that the specimens exhibited were taken in a peculiarly sheltered spot at Kingsdown, the *M. unionalis* among *Spilodes palealis*, and the *M. polygonalis* on the flower

of hemp agrimony. Mr. Stevens possessed one taken at Hurstpierpoint, Sussex.

Mr. Barrett, on behalf of Mr. Capper of Liverpool, exhibited some 400 coloured drawings of the remarkable varieties existing in his (Mr. Capper's) rich collection. They had been executed by Mr. Mosley of Huddersfield.

Mr. Tunaley exhibited a lantern for sugaring purposes, in which a kind of paraffin wax called "cera" was burnt, thus obviating the use and smell of oil. It was quite clean, and gave a good illumination. The material could be carried in the pocket, and the lamp replenished while alight with pieces cut off with a knife.

Mr. South exhibited a banded specimen of *Vanessa urticae* approaching var. *connexa*, Butl., taken in his house at Tooting on March 22nd, and stated that it was the first example of this form that he had taken.

Mr. Turner exhibited an apparatus for taking moths from lamps, &c., sent to him for exhibition. It was of pocket size, and fitted to go on the end of stick or umbrella.

Mr. McArthur exhibited a series of *Hypsipetes trifasciata* (*impluviata*) which he had recently bred from larvæ taken in Hoy, Orkney, and fed throughout on heath. This was thought to be most unusual, as in southern localities alder is almost invariably the food. The specimens were of a rich chestnut colour, very heavily marked.

APRIL 23rd, 1896.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Briggs exhibited a male specimen of *Stylops melitta* taken by himself at Leatherhead, Surrey, on 18th April, 1896, flying in the garden.

Mr. C. G. Barrett exhibited a series of *Triphæna comes* from Surrey, Norfolk, South Wales, North Wales, North Ireland, and N.E. Scotland.

Mr. Turner exhibited a short series of the same species.

Mr. Adkin exhibited a very long and varied series of the same species, obtained from many different localities in the British Islands, and also types of the species for comparison from several places in the Palæarctic region outside Britain.

Mr. Adkin read a paper entitled "Further Notes on *Triphæna comes* (*orbona*)" (page 93).

In the discussion which followed the reading of this paper Mr. Barrett said that the scalloped appearance of the second

line was due to the union of a row of dots with thickenings of the slight curves of that line. He referred to the habit of the species of hiding under leaves, &c., on the ground, and thought that no protective resemblance was necessary. The darkening might be connected with a humid climate, and instanced *Tephrosia biundularia* as being dark in some moist localities. Mr. Tutt remarked that the development of the strongly scalloped line had been worked out by the Rev. Mr. Burrows in another species, namely, *Calamia lutosa*; the feature was common to many of the genera of the Noctuidæ, and was well developed in some of the *Triphæna* alliances. He further said that where the melanic form occurred locally in Aberdeenshire, Moray, Sutherland, the Orkneys, and the Isle of Lewis, the climate was notoriously mild, Moray being one of the mildest districts in Scotland, and that therefore low temperature could not be the influence causing the dark forms. He considered, without going into the initial cause of the variation in the organism, that the dark colour was due to natural selection, which had developed the melanic tendencies for protective purposes. In his experience *T. orbona* (*comes*) settled on the bare ground on the sand-hills at Deal. With regard to the synonymy of the species, he considered that the old nomenclature was the correct one, and that *T. orbona*, Hufn., should be the name used for this, the commoner of the two species, and *T. subsequa*, Hb., for the rarer; Hufnagel's description containing no mention of the short oblique dark costal mark that characterised *T. subsequa*. Mr. McArthur said that in Orkney, where the only form of the species found was the dark one, he met with very few examples where high furze existed, the majority of them being taken on an almost bare peat moor, where they availed themselves of whatever cover they could find, and he had never seen one at rest fully exposed on the peat. Mr. Adkin, in reply, thought that possibly the flouncing of the second line, noticed in the examples from Scilly, was a case of atavism; but he could not accept this as an explanation of the *curtisii* forms, regarding which he considered our present knowledge was too incomplete to admit of any definite conclusion being formed. As to nomenclature, he noticed the name used for the commoner of the two species in the most recent standard works was *T. comes*, Hb., and he had no reason for supposing that their authors had not been able to form a sound judgment on the question.

MAY 14th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. Enock exhibited specimens of two very rare aquatic Hymenoptera, viz. *Prestwichia aquatica*, which uses its legs in swimming, and which has not been recorded since its first capture in 1862; and *Caraphractus cinctus*, Haliday, = *Polynema natans*, Lubbock, which uses its wings in swimming.

Mr. R. Adkin exhibited a series of *Melanippe hastata* bred from larvæ feeding in shoots of *Myrica gale* collected in Sutherlandshire, together with series of the same species from Sussex and county Cork. The southern series, he said, were fairly uniform in pattern, but the Cork examples differed from those from Sussex in having a pale ochreous tone instead of the dead white ground colour; but in both the basal and submarginal black markings were similar, leaving a broad light band across the wings between them, on which there was only the faintest trace of two or three black dots. The individuals in the Sutherland series, on the other hand, in addition to being much smaller than the southern representatives, showed considerable variation from them and among themselves; the black markings in some of them being much broken up, and the black dots on the white band so much increased in size and number as to form an almost complete chain in the more strongly marked examples.

Mr. Carrington exhibited specimens of *Helix aspersa*, var. *exalbida*, from Devizes, with the type form for comparison, and also brought before the members the new work on the Mollusca, by Taylor.

Mr. Barrett exhibited a series of *Abraxas ulmata* (*sylvata*), and a series of *Pieris rapæ*, var. *crucivora*, from Japan. The latter, which are of the size of *P. brassicæ*, have a very considerable suffusion of black from the base of the fore-wings, very large spots, and in some instances a partial fusion of the spots in the females. Mr. Tutt thought it might be largely a matter of nutrition, as there was a great profusion of succulent vegetation in Japan. He instanced the two seasonal forms of *Papilio machaon*, which were taken in that country. Mr. South said that the large form of the latter insect was called *P. hippocrates*, and referred to the two seasonal forms of *Chrysophanus phlæas* found in Japan, the dry season form being comparable to var. *eleus* of South Europe. Mr. Carrington, referring to the rapid spread of *P.*



*rapæ* in British North America, stated that many specimens showed a marked increase in the depth of the yellow coloration of the under side. He thought that the insect's constitution must be very hardy to withstand extremes of temperature, such as  $90^{\circ}$  of frost and  $138^{\circ}$  heat. There was apparently a continuous brood throughout the Canadian spring and summer. Mr. Tutt remarked on the oscillation in abundance and rarity of the last species. There had evidently been a struggle between this species and a closely allied native species, *Pieris oleracea*, in which *P. rapæ* had finally shown itself capable of holding its own. It was thought that most likely as the two species were closely allied they had interbred. The other species concerned was now most difficult to obtain.

Mr. Tutt exhibited for Mr. Merrifield a number of bred specimens, the outcome of his recent experiments.

1. Two bred specimens of *Aglaïs* (*Vanessa*) *urticæ*, var. *ichnusa*, from S. Europe, a captured ordinary form for comparison. The two specimens showed an extreme development of the red both in amount and depth; while, on the other hand, the black was deficient.

2. Several specimens of the same species which had been subjected to different temperatures during pupal development.

- (a) High temperature. The specimens showed a strong tendency towards the *ichnusa* form.

- (b) Low temperature. These specimens showed an opposite tendency,—the red narrowed, the black increased in amount and depth; the scaling was weak, and the fore-wings were decidedly narrower.

3. Several specimens of *Pyrameis atalanta*. The colour changes showed that in this species the cooling did not intensify the dark markings, but increased the white, while at the same time the red was restricted in area. An increased temperature produced just the opposite result. In two specimens, one of the cooled and one of the heated, both females, an extra white spot was developed below the red band.

4. *Euvanessa antiopa*, one normal, and two which had developed under a low temperature. This experiment suggested an exact parallel to the case of *A. urticæ*. The dark markings had spread, but were not so rich. The blue was much increased in amount and richness. The border was very considerably studded with dusky scales. Even the shape had been considerably modified, the unnatural con-

ditions of development always showing themselves in a tendency to produce abnormalities.

5. *Gonepteryx rhamni*.

(a) Those bred at a higher temperature had a considerable increase in the size of the discoidal spots, and brought to mind specimens which were obtainable in some parts of the Tyrol.

(b) Those cooled were females, and had the ground colour considerably more yellow than in the normal forms. This was a form of variation which rarely occurred in Britain, but which had been taken by Mr. Tutt near Bregenz.

Mr. Tutt remarked that he did not believe that any particular variation was due to any one factor, but to many; although there must be one predominant factor, or more, to cause any particular variation. If altered conditions were imposed for the purpose of influencing development, they must be applied during the histolysis of the pupal structure, at the real time of the formation of the scales. In the consideration of these experiments it must be remembered that the results obtained mainly affected the upper surface; in the *Rhopalocera* the under sides, which were protective in their coloration, were but slightly influenced. *Triphæna orbona* and, say, *Aglais urticae* were certainly not parallel cases in variation. In the former the upper side was protectively coloured; in the latter it was the under side. What exposure to cold might do for *A. urticae* would not be possible with *T. orbona*, as only the non-protective surfaces were influenced to any considerable extent by the application of varied temperatures. If var. *curtisii* of the latter species was a remnant of the original form, then the Continental form was a survival of the new. The tendency of the objects of these experiments to become darker or lighter was in no way connected with protection.

Mr. F. Clark exhibited living specimens of parasites of the stickleback (*Argulus foliaceus*), together with a microphotograph of the same enlarged thirty diameters. In this the complex structure of the parasite was well shown, particularly the organs for attachment to its "host," these being most perfect in character for that purpose.

Mr. Tutt read a paper entitled "Is Cold the Cause of Melanism in Scotch Specimens of *Triphæna orbona* (*comes*)?" (printed on page 99).

In the discussion which ensued, Mr. Barrett said that no doubt cold was a minor factor. On one occasion, at the end of March, when there was not the slightest move in

vegetation in Scotland, he had journeyed to Haslemere, and found the tallows in full bloom and well attended by insects. The darkening in Mr. Merrifield's experiments showed the influence of two factors very strikingly,—the absence of a period of any great heat, and the slow development in a long-continued comparatively low temperature. Mr. Carrington had found tallows in Scotland in full bloom in the middle of March, some even being over. The time of flowering varied much with the altitude and the topography of the district. At Rannoch the date varied from March to the end of June. In parts some species were more forward than in England, and in many districts there were never any severe frosts, the climate being very moist. Mr. South concurred in the view that *curtisii* was an older form of the species than that which was considered typical. Mr. Carrington said that there were many instances to show us that evolution was still going on, and that fresh conditions often caused a return to or a re-development of an ancestral form.

Mr. Step sent for exhibition specimens of the plants *Glaux maritima* and *Silene maritima* from Portscatho, and communicated the following note :

"*Glaux maritima*, L. Sea-milkwort or black saltwort. This pretty member of the order Primulaceæ is the sole representative of the genus *Glaux*. It does not appear to be very well known even among coast plants, although it is sufficiently plentiful. In this neighbourhood, Portscatho, Falmouth, it is abundant among the rocks a little above high water. The creeping rootstock makes its way between the laminæ of the slaty rocks, and eventually becomes quite woody, their smaller fibres penetrating deeply into the rocks. The large specimen exhibited will give some idea of its performances in this direction. To secure it I had to prise off a great sheet of slaty rock which had been loosened by root expansion. The round smooth stems grow erectly to a height of four or five inches. The narrowly oval leaves are opposite or very nearly so, glossy, and their surface minutely pitted. The flowers are all axillary. There are no petals, but the five-parted bell-shaped calyx is coloured pink, with five streaks and dashes of crimson along the edges and towards the base. The flowers have been out a fortnight or nearly. I found plenty on May 2nd, whose condition convinced me they had been open quite a couple of days. My record for 1895 is first week in May. The books say June and July.

"*Silene maritima*, Withering. The sea-campion. This plant bears a very close resemblance to *S. cucubalus*, Wibel (= *S. inflata*, Sur.), the bladder campion, and some have doubted whether the differences are sufficient to be regarded as specific. It is of more diffuse habit than *cucubalus*, the stems not growing erectly, but falling over on all sides, and forming a patch several feet in diameter, well covered with the pure white flowers. These are borne in few-flowered (1 to 4) cymes, whilst those of *cucubalus* are in many-flowered panicles. The petals are less deeply cleft in *maritima*; and whereas the bracts in *cucubalus* are thin, dry, and transparent, in *maritima* they are green and opaque. This plant also is set down in the Floras as flowering in June. Last year I gathered flowers and green seed-vessels on April 28th. This year it was well out on several parts of our cliffs by April 5th, and its first flush of beauty is now past; full-sized capsules are almost as plentiful as flowers.

"These two instances suggest that the time has come when some attempt might be made to correct the dates given in the Floras for the flowering of our wild plants. This is a thought that has been in my mind for several years; and I suppose most botanists frequently notice the wide divergence between their observations and the books in this respect. Since residing so far south this difference has been, in my own case, accentuated. Here we are seasonably considerably in advance of many other portions of the country; but I think botanists in any part of these islands who note the first general flowering of a few species will find their dates in many cases differing from those given in the books. The book dates appear to have been religiously copied from the Floras of a past generation, and are now regarded as a standard. Probably they give the average dates for the whole country, and are therefore wrong for most districts. By a little co-operation among field botanists in various parts of the country the average dates might be correctly formulated in the course of a few years, and future editions of standard works might give the required information for such divisions of the country as might be fixed upon with due regard to our present knowledge of climatology. Such provincial average dates would, I think, be more valuable to botanists, and could not be without interest for the entomologist and the meteorologist."



MAY 28th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

A. H. Bartlett, Esq., M.A., 34, Vanbrugh Park, Blackheath, S.E., was elected a member.

Mr. McArthur exhibited bred series of *Hypsipetes ruberata* and *H. trifasciata* (*impluviata*) from Hoy, which, as imagines, were inseparable one species from the other. The latter were reared from larvæ fed on heather instead of the usual food, alder. The pupæ of *H. ruberata* were enclosed in a cocoon (some of which were exhibited), and were thus to be distinguished from those of *H. trifasciata*. Also from the same locality, bred series of *Eupithecia venosata*, *E. pulchellata*, and *Melanippe fluctuata*, including var. *neapolisata*.

Mr. Warne exhibited the wine-glass shaped egg-case of a spider (*Agellena brunnea*) from the New Forest, found suspended among heather.

Mr. Sauzé exhibited a very small specimen of a Coleopteron (*Sinodendron cylindricum*), taken by Mr. Adkin at Worthing; an Hemipteron, *Ledra aurita*, one of the remarkable family Membracidæ; *Silpha quadrimaculata*; and the Diptera *Hippobosca equina* and *Hoplia philenthus* all from the New Forest.

Mr. West, of Greenwich, exhibited, on behalf of Mr. McArthur, specimens of *Chrysomela arvensis* and *C. sanguinea* from Hoy, with specimens of *C. distinguenda* (from the south of England) for comparison with the latter.

Mr. Edwards exhibited a twig of fir containing the larva of *Tortrix piceana*, from Brockenhurst.

Mr. Filer exhibited larvæ of *Pacilocampa populi* and *Trichiura cratægi* from Epping Forest.

Mr. Montgomery stated that he had reared a considerable number of *Saturnia carpinii* larvæ, and had found a large percentage infested with ichneumons. Mr. Adkin also remarked on the abundance of ichneumons he had recently seen in his garden and elsewhere.

Mr. Edwards read a short report of the field meeting held at Brockenhurst. Imagines were more plentiful than last year. Larvæ beating was exceedingly productive. The weather was very fine, and some ten or twelve members attended during the three days.

JUNE 11th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Monington, of 141, Broomswood Road, Wandsworth Common, S.W., was elected a member.

Mr. Lucas exhibited specimens of Neuroptera-Odonata, viz. *Ichnura elegans*, *Pyrrhosoma minium*, and a series of *Platetrum depressum*, including a male which had not yet assumed the blue colour characteristic of the sex, all taken by Mr. Henry J. Turner, at Folkestone, on May 17th.

Mr. West (Streatham) exhibited a series of *Macroglossa fuciformis*, taken at Brockenhurst during the Whitsuntide field meeting.

Mr. Barrett exhibited the specimens of the new *Noctua*, *Leucania favicolor*, described by him in E.M.M., May, 1896, and which were captured on the coast of Essex by Mr. G. F. Matthew. The species was nearly allied to *L. pallens*, from which it differed not only in the colour, but in the shape of the wing. Although the hind wings were somewhat similar to those of *L. straminea*, the specimens were certainly distinct from that species. He also exhibited several forms of *L. pallens* from the same locality, one of a beautiful bright red colour, the veins being without any trace of white lines; a very large dark specimen of *Mamestra abjecta*, and a beautiful var. of the same species showing all the markings intensified and distinct upon a lighter ground; an example of *Apamea gemina*, var. *remissa*, and a specimen of *Hadena genistæ*, both of which were comparable in many markings with the var. of *M. abjecta*; a *Eupithecia* having no scales developed on the wings except on the margins; and two pupæ of an undetermined species of *Papilio* from Madagascar, one being attached to the back of the other.

Mr. N. D. Warne exhibited series of *Procris statices* and of *Emmelesia adæquata* (*blandiata*), including a var. of the latter having the central band nearly complete, taken at Keswick.

Mr. Henry Tunaley exhibited a specimen of *Empis tessellata*, which had, when captured, just attacked a *Tipula*. The middle legs of the *Empis* were clutched over the shoulders of the *Tipula*, while the hind legs were similarly placed under the wings, thus effectually preventing the struggles of its prey, and rendering it absolutely powerless to fly. The fore-legs of the *Empis* were free to hold on to a grass stem or other support. He stated that the *Empis* flies some six inches above the grass when hawking. After capturing a

*Tipula*, the lancet was darted into the thorax, and apparently a poison was injected. The stroke was not always successful, owing to the struggles of the *Tipula*. He had captured both the *Empis* and the *Tipula* separately, and having placed them together had observed the attack on the *Tipula* after the first struggles to escape. The legs of the *Tipula* were often torn off in the attack. Mr. Tunaley also exhibited a remarkable var. of *Coremia designata* from Ranmore, having the light band narrower than usual, but filled in with the dark colour. The inner margin was straighter than in normal specimens.

Mr. Mansbridge exhibited a specimen of *Syrichthus malva* (*alveolus*), having a notch at the apex of all four wings, the cilia which belonged to the hind margin being present in the notch. Mr. Turner suggested an injury to the pupæ as the cause of the phenomenon, and remarked that it was a solitary specimen, and not comparable to the angularity observed in many specimens of *Polyommatus corydon* by Mr. Tunaley. Mr. Barrett doubted an injury being the cause, and said that the cilia near the apex were shorter, and suggested that the white patch accentuated the deficiency, and that the appearance was partly an illusion.

Mr. Edwards exhibited a specimen of the rare *Papilio danisepa* from the Khasia Hills, and also a short series of *Leptocircus curius*, on which genus he contributed the following note.

"List of species of *Leptocircus* recognised by various authorities :

<i>L. curius</i>	...	Java and Siam	...	Distant.
<i>L. virescens</i>	...	Java and Moulmein	...	"
<i>L. meges</i>	...	India	...	"
<i>L. wilsonii</i>	...	Philippines	...	Semper.
<i>L. decius</i>	...	Philippines	...	Luzon.
<i>L. ennius</i>	...	Celebes	...	Felder.
<i>L. curtius</i>	...	Celebes	...	"

"*Leptocircus*, Swainson. This genus differs from that of *Papilio* in all its sectional groups by having the third, fourth, and fifth subcostal nervules of the anterior wings with a common origin. *Leptocircus* seems well and naturally classified in a position intermediate between the swallow-tail *Papilios* and the *Hesperiidæ*. The genus is not of large extent, and is purely Eastern in distribution. It appears to be confined to the Indo-Malayan region and other portions of the Malay Archipelago, although two species occur in

the Malay Peninsula, viz. *L. meges* and *L. curius*. Captain Godfrey, from Perak, writes that *L. meges* was generally found overrunning streams, and that the transparent wings and long streaming tails gave it to some extent the appearance of a dragon-fly, but its flight hardly bears out this resemblance, consisting of a kind of dancing motion, a series of mid-air jumps different from the swift flight of a *Libellula*; still the rapid vibration of the wings strongly reminded him of the dragon-fly. Mr. Forbes, in remarking on the way *L. virescens* derives protection from mimicking the habits and appearance of a dragon-fly in the island of Sumatra, says it reminded one of some of the European Neuroptera; he goes on to say that when it settles on the ground it is difficult to see as it vibrates in constant motion its tail and wings, so that it is a mere haze, as it were.

Mr. Tunaley remarked on the abundance of larvæ, especially on oaks. In some places the larvæ of *Taniocampa miniosa* were extremely common. In the discussion which ensued several members adverted to the fact that this year the defoliation of the oaks was due not so much to the attacks of *Tortrix viridana* as to the larvæ of the various species of the genus *Hybernia*. Some members had seen rooks in the defoliated trees, but whether they were seeking the lepidopterous larvæ or not could not be ascertained. It was noted that the oaks having bright green foliage were comparatively free from attack, whereas the trees having dark greenish-brown foliage had suffered the most. This was especially noticeable in Epping Forest.

JUNE 25th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. West, of Streatham, exhibited a bred series of *Hypsipetes ruberata*, one specimen being almost uniformly dark, and another having only a dark band; a specimen of *Trochilium crabroniformis*, bred from an osier stem cut at Streatham, from which he had expected to breed *Sesia formicæformis*; and a specimen of *Gordius aquaticus* found that morning in damp earth in his garden.

Mr. Robert Adkin exhibited a series of *Eupithecia venosata*, bred this spring from larvæ taken in the island of Hoy, Orkney; together with series of the same species from Shetland, Forres, and the Isle of Man, for comparison, and remarked that although there was a great similarity among



all the Scotch series, those from Orkney were of a somewhat browner tone than either of the others; while in the Isle of Man examples the net-like markings were distinctly more conspicuous than in any of the others shown, and more nearly resembled the ordinary South English form. He also exhibited full-fed larvæ of *Calocampa vetusta*, which he had reared from ova from Inverness-shire, having fed them on dock throughout with satisfactory results; and pupa-skins of a species of dragon-fly (probably *Platetrum depressum*) found among reeds at Byfleet on the occasion of the Society's field meeting on Saturday last.

Mr. Barrett exhibited a series of *Osmylus chrysops* from Haslemere.

Mr. South exhibited the most remarkable specimens of a brood of *Spilosoma menthastri*, originating from Aberdeen. Several were more or less smoky, one specimen had dark fringes, and another was a most unusual form, in which the edges of the black markings having run together had the appearance of a smudge all round.

Mr. McArthur exhibited the five most noticeable forms of *Abraxas grossulariata*, being the pick of some 3000 he had bred this year from larvæ obtained in Fulham. 1. The dark markings considerably increased in area and somewhat suffused. 2. The black on the fore-wings external to the yellow band very suffused, having but few traces of white. 3. Slightly smoky, having only a very small amount of yellow, while the black spots were blurred and confluent. 4. The fore-wings almost entirely suffused with black, and the hind wings with broad black marginal band quite complete. 5. Fore-wings were largely suffused with black, the hind wings with a narrow black marginal border, from the centre of which an elongated black mark extended to the middle of the wing, causing a striking appearance. Mr. Barrett said that the third form was very rare, Mr. Gregson had bred many thousands, but very few of the specimens approached this form.

Mr. Manger exhibited the huge flower of the exotic orchid, *Stanhopea tigrina*, having the odour of stale meat.

Mr. Dennis exhibited a short series of *Cænonympha typhon* from North Lancashire, taken early in June. This date was considered most unusual. The specimens were of the Delamere Forest form, having very pure white markings on the under side. He also exhibited several specimens of *Cyaniris (Lycæna) argiolus* from Horsley, in which the blue closely approached the *bellargus* shade of colour. One

female had the black margin well developed for an example of the first brood.

It was reported that *Limenitis sibylla* was out early in June in the New Forest.

Mr. Turner made the following remarks upon the field meeting held at Byfleet on June 20th :

Under the guidance of Rev. J. E. Tarbat about a dozen of the members were introduced to a new collecting ground, the banks of the almost disused Basingstoke Canal. From the varied growth in the water and on the banks not only was the scenery very pretty, but it was considered that the locality ought to prove a good one for insects generally. Among Lepidoptera the following were noted :

LEPIDOPTERA IMAGINES.—*Epinephile ianira*, very common; *Cænonympha pamphilus*, common, one taken by Mr. R. Adkin, had the row of ocelli on the under side of hind wings very well developed; *Lycæna ægon*, sparingly; *Hesperia sylvanus*, fairly common; *Hadena genistæ*, one specimen; *Erastria fuscula*, fairly common, at rest on the trunks of oak, &c.; *Pseudoterpna pruinata* (*cytisaria*), several among *Genista anglica* on the common; *Phorodesma pustulata*, one reported by one of the members; *Ematurga atomaria*, a few still out; *Eubolia plumbaria*, common; *Hydrocampa nymphaæata* and *H. stagnata*; *Crambus pratellus*, common, and *C. dumetellus*, one; *Tortrix viridana*, an intolerable nuisance; *Dictyoptyx læflingiana*, common, and variable as usual; *Sericoris*, probably *rivulana*, several; and *Rivula sericealis*, one. LARVÆ. — *Pygæra pigra*, on aspen; *Gonoptyx rhamni* on buckthorn; and *Dicranura vinula* feeding on aspen, an unusual food. It was thought that the district would prove to be a very rich one for the larvæ hunter if systematically worked. PLANTS.—*Impatiens fulva*, an introduced plant, which has spread much in Surrey; *Ranunculus sceleratus* and *R. aquatilis*. The water-bistort, *Polygonum amphibium*; arrowhead, *Sagittaria sagittifolia*; and *Nuphar lutea* were in more or less profusion on the canal waters. Plants of flowering-rush, *Butomus umbellatus*, were seen, and the burweed, *Sparganium ramosum*, was most abundant.

For dragon-flies this was an admirable locality. One specimen of the rare *Anax formosus* was captured, and a number of the very local *Erythromma najas* were taken, besides many of the commoner species, such as *Agrion puella*, *A. pulchellum*, and *Enallagma cyathigerum*.

Among Mollusca, *Paludina contecta* and *Limnæa auricularia* were seen in quantities.

JULY 9th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Robert Adkin exhibited a short series of *Dianthæcia nana*, bred from larvæ taken in the island of Hoy, Orkney. The specimens were all dark in colour, about midway in tone between the Shetland and Scottish mainland forms. Also a series of *D. capsincola* from the same locality, which showed no variation from the usual English form, except that one specimen had the orbicular stigma very yellow.

Mr. Auld exhibited a bred series of *Abraxas grossulariata*, including a specimen showing a most unusual form of variation; the outer half of each wing was normal, but the basal portion was curiously marked with elongated black streaks, irregular in length, and not extending to the base in the hind wings.

Mr. Turner exhibited living pupæ of *Gonopteryx rhamni* from larvæ taken during the field meeting at Byfleet; also life-histories of several species of *Coleophora*, namely, *C. lineolea*, from Brockley and Lewisham; *C. albitarsella*, from Lewisham; *C. palliatella*, from Epping Forest; *C. laricella*, from Carlisle; and *C. fuscadinella*, from Carlisle, showing the very young curved cases and the straight mature ones.

Mr. Lucas exhibited bred specimens of the rare dragon-fly, *Erythromma najas*, with pupa-skins; of a Dipteron somewhat resembling a dragon-fly; and of *Raphidia*, *Ephemera*, and *Chrysopa*.

Mr. Enock exhibited a living as well as a mounted specimen of the male of *Prestwichia aquatica*, which, with the assistance of Messrs. Scarfield and Dennis, he had been successful in discovering in a pond in Epping Forest. It was apterous, having only the merest rudiments of wings, jumped like a flea in the water, or sailed about on the surface. He did not expect to find that the species was parasitic on eggs, for the ovipositor was too long and strong, while the legs were comparatively weak. Perhaps the ova were deposited on larvæ. Ganin was responsible for the statement that the species was parasitic in the eggs of dragon-flies, and he had made most careful drawings of the insects bred, which undoubtedly were not *Prestwichia aquatica* (*Polynema natans*), but a species of Mymaridæ having the characteristic 13-jointed antennæ and sessile abdomen of that group. He (Mr. Enock) felt absolutely certain of this, as he had bred a species of Mymaridæ from dragon-flies'

eggs which corresponded in every particular with the sketches of Ganin. The *Prestwichia* was distinct in having 12-jointed antennæ and a petioled abdomen. He hoped ere long to solve what was still a great mystery.

JULY 23rd, 1896.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. W. West, of Streatham, exhibited specimens of *Catocala promissa* and *C. sponsa*, which he had bred from larvæ taken during the Society's field meeting at Whitsuntide.

Mr. Robert Adkin exhibited a series of a *Hypsipetes* that he had bred from the same lot of larvæ from Orkney as those exhibited by Mr. McArthur on May 28th. He was unable to say whether they were referable to *H. trifasciata* (*impluviata*) or *H. ruberata*, but he thought the whole of them more nearly approached the former than the latter species. Also a specimen of *Cænonympha pamphilus* taken on the occasion of the Society's field meeting at Byfleet on June 20th, in which the row of ocellated spots on the under-side of the hind wings was unusually strongly developed.

Mr. Dennis exhibited a series of reversed specimens of *Cupido* (*Lycæna*) *minima* taken at Horsley, showing a complete gradation from a specimen almost without spots on under-side to one having large and well-developed spots; also a specimen very liberally scaled with blue on the upper surface. Mr. Turner said that wherever he had met with this species he found the same extent of variation in the number and size of the spots on the under side.

Mr. Fremlin exhibited specimens of *Polyommatus astrarche*, var. *salmacis*, from Castle Eden Dene.

Mr. Mansbridge exhibited a series of varieties of *Abraxas grossulariata*, bred from larvæ obtained at Horsforth. Of the imagines obtained from about 150 larvæ, only two or three per cent. showed any considerable variation, compared with fifteen per cent. last year. One specimen exhibited was unusually light and devoid of markings; two specimens were asymmetrical, one of them being quite normal on one side and streaked on the other; one had a continuous band of black on the hind wings, and another was nicely radiated on the fore-wings.



Mr. West, of Greenwich, exhibited a Hemipteron, *Dicyphus epilobii*, found on *Epilobium* at Eltham.

Mr. Moore exhibited a specimen of the second brood of *Cyaniris (Lycæna) argiolus* taken at Oxshott on July 12th; also specimens of *Plebius (Lycæna) ægon*, one of which was without the marginal red markings on the upper surface, and another having confluent spots on the under surface.

Mr. Fremlin said that he had noticed a mite firmly attached to the leg of a fly which was crawling on a window, and asked if it was customary for Diptera to be so infested. Mr. West stated that mites very largely inhabited the cracks and uneven surfaces of damp and rotting wood, and that their presence on the flies was simply a method of migration.

Mr. R. Adkin read a report of the field meeting held at Chalfont Road on July 18th (page 105).

#### AUGUST 13th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. S. Stevens exhibited a specimen of *Papilio machaon* from Wicken Fen, which, besides being unusually small, had the marginal black band on the hind wings very narrow, and the nervures on all the wings very sparsely marked with black scales.

Mr. R. Adkin exhibited a series of *Pachnobia hyperborea (alpina)*, bred during the present summer from pupæ taken at Rannoch; he was pleased to find that this species had again appeared in its old habitat after an apparent absence for several years.

Mr. McArthur exhibited a preserved larva of the same species on its food-plant, the crowberry (*Empetrum nigrum*), and said that when not feeding, it lay hidden among a moss which was peculiar to the mountain slopes. The pupa was found at the roots either of the *Empetrum* or the moss. Some members remarked that this moss was probably the fringe-moss.

Mr. Fremlin exhibited a short series of *Phigalia pedaria (pilosaria)* from Saltaire, showing both the dark forms without the reticulations and the less dark forms with the reticulations. The former were very uniform in coloration, and the nervures were in no way marked.

Mr. H. Moore exhibited the photographs of two hands and of a broken and self-set arm, taken by the Röntgen

process. He also exhibited a collection of insects from South Africa, including the following Orthoptera:—*Pachytylus pardalinus*, which was often in such numbers as to be a plague; *P. peregrinus*, the North African species, which extended its range, although not in great numbers, to the South; *Cyrtacanthacris purpurifera*, a very large species; a mole cricket, *Acheta africana*, from Johannesburg, where they are caught by the children to play with; and an immature specimen of the rock-hopper, *Akicera carinata*, which is very sluggish in its habits, and apparently well protected by its coloration; a number of Coleoptera from Pretoria, where thousands are attracted by the electric light; a few specimens of Hymenoptera, and a specimen of the “queen moth,” *Argema mimosæ*, from Pietermaritzburg, where the larvæ were more or less gregarious; the imagines congregated on particular shrubs, and could be easily captured by the fingers, being very sluggish and seldom seen to fly.

Mr. Sauzé exhibited a specimen of *Cicadetta montana*, one of three taken in Surrey by Mr. Heasler, who had been attracted by the unusual stridulation, and had beaten the oaks from whence the noise proceeded. This fact was considered most important, as clearing up a doubt as to whether the species did stridulate in this country, there being no previous record of its having been heard to do so.

Mr. West, of Greenwich, exhibited a short series of the Hemipteron *Eurygaster maurus*, a local species from Folkestone.

Mr. Mansbridge exhibited a series of cocoons of *Clisiocampa neustria*, one of which was double. When opened it was found to contain two moths which had emerged from the pupæ, but which had been quite unable to get out of the cocoon, because, it was suggested, they hindered each other's attempts; or, the cocoon being so large, they were unable to concentrate their attacks upon the right part, and perhaps could not get sufficient purchase for their feet and body.

Mr. Barrett exhibited a variable series of *Melanippe subtristata* and *Hydrocampa nymphaealis*, received from Mr. Boyd. He also exhibited four British specimens of *Plusia ni*, with an Italian example for comparison. Two belonged to Mr. Jeffries, one of which was taken in Surrey, and one about twenty years ago in Cornwall; and two belonging to Mr. C. A. Briggs, taken a few years ago also in Cornwall; a very fine variety of *Cleoceris viminalis*, having the basal half of the fore-wings very dark, in contrast to the pale outer portion;

and a remarkable variation of *Agrotis exclamationis*, in which neither of the stigmata was developed, but the elbowed and basal lines were very distinct and perfect on the uniformly pale brown ground colour.

A discussion took place on the occurrence of *Colias edusa* this year. Mr. Stevens had not seen a specimen, although he had been in various parts of Surrey, Hants, Sussex, and Kent during the last month. Mr. A. E. Hall, who had been during the last few weeks in South France, Switzerland, and North Italy, had only seen two specimens of this species, one being var. *helice*. Mr. Adkin said that some years ago Mr. Weir had noticed but few examples during a tour on the Continent, while in England there were swarms. As regards their migration, several members thought that butterflies often came with the wind. Mr. McArthur, however, was of opinion that they migrated against the wind. In the Himalayas, when the wind was blowing down the slopes, he had taken large numbers of butterflies coming up through the gaps right in the face of the wind, but as soon as the wind changed hardly a specimen was to be obtained. Mr. Winkley had noticed butterflies resting on the sea when calm some miles from land. Several instances were given of the actual importation of Lepidoptera in various stages in merchandise or on vessels. Mr. Mansbridge mentioned that he was acquainted with a man residing in Yorkshire who had a considerable number of large exotic butterflies, such as *Morphos*, which he had taken alive on the inside of the lids of cases containing orchids and other plants imported from abroad. The pupæ or larvæ were among the foliage when collected, and the imagines would emerge, and, being in the dark, would remain quiet until the case was opened. Several members had seen butterflies fly in from seawards and rest, as it were, exhausted on the sands.

AUGUST 27th, 1896.

R. SOUTH, Esq., F.E.S., *President*, in the Chair.

Mr. Montgomery exhibited a beautiful xanthic example of *Epinephele tithonus* taken at Jevington, July 27, 1896. There were no black scales on the upper side, all the usually black areas and markings being of a rich fulvous, just distinguishable in shape from the rest of the wings. The under side had brown spots instead of the usual black markings.

Mr. Adkin exhibited the unopened flower-heads of the ivy upon which were the egg-shells of *Cyaniris* (*Lycæna*) *argiolus*, and said that he had seen the females depositing the ova. He hoped at a future meeting to give further details of the observations he was making on this species.

Mr. Manger exhibited a specimen of *Eugonia* (*Vanessa*) *polychloros* taken on May 24th at Brockley. There was stated to be no elm in the near neighbourhood, and it was suggested that the larva had probably fed on lime.

Mr. H. Moore exhibited very fine specimens of *Papilio daunus* and *P. cressphontes*, from St. Augustine's, Florida, U.S.A. He also showed several specimens of *Anisomorpha buprestoides*, one of the "Walking-sticks." Scudder states that this insect "is a sluggish creature in Florida and Texas; it will, when seized, spurt a strong vapour which slightly burns a man's skin. When dissected the glands which furnish the supply will often be found of exceptional size, quite filling the sides of the thorax."

Mr. Mansbridge exhibited a series of *Polia chi* bred from ova laid by a rather dark female from Huddersfield. The series varied from dark to the common type. There were no specimens of the *olivacea* form, but several examples had all the lines, bands, and markings of that variety, and were dark without the olive-green shade.

Mr. South exhibited two specimens of *Caradrina ambigua*, taken by Mr. Woodforde near Exmouth in July this year. These examples were very pale in coloration, and in this respect differed from specimens he had seen from the Isle of Wight.

Mr. Barrett inquired if any member was positive that larva of *Hadena adusta* remained as a larva in the cocoon through the winter, changing to a chrysalis in spring. Mr. McArthur said that he had frequently found larvæ in the spring at the roots of moss.

Mr. Auld stated that he had been collecting in the New Forest, where varieties seemed this year to be somewhat common. He knew of two collectors who had taken between them no less than twelve examples of *Limenitis sibylla*, var. *nigrata*, and he had seen a fine variety of *Dryas* (*Argynnis*) *paphia*, possessing a pale border and a dark centre. Another collector had taken a variety of *Polyommatus* (*Lycæna*) *icarus*, having no vestige of spots on the under sides, = var. *persica*. At sugar he noticed that *Catocala sponsa* came usually about 7.30 p.m.

Mr. Turner said that he had taken three examples of the



second brood of *Zonosoma annulata* at sugar during the third week in August in the woods of N. Kent.

Continuing the discussion commenced at the last meeting, Mr. Adkin said that he had spent a fortnight at Eastbourne, but had not seen a single example of *Colias edusa*. Mr. Mansbridge stated that he had been told by a collector that the species was quite common on the east coast; but Mr. Tutt's son, who had been to Dovercourt for a holiday, had not seen any specimens there. During a month spent in the S.E. of France, Mr. Tutt had only seen some half a dozen. On the Continent he had always found *C. hyale*, the commoner insect. It occurred in equal abundance both in elevated districts and in the lowlands. It might be that his holiday fell at a time between the broods, viz. in August. Yet on the Mediterranean littoral the species was undoubtedly continuous brooded throughout the year. Mr. Walker had stated that about two months was the space of time between the broods. Mr. Mansbridge said that the North American species corresponding to *C. edusa*, viz. *C. eurytheme*, had three broods—in March, July, and September. Mr. Barrett said that one October, while in Pembrokeshire, he had observed females searching for clover, &c., to deposit their eggs upon. In the same locality, on the following June 4th, the weather being very hot, he found four specimens of *C. edusa*, with their wings not fully dry, and evidently just from the pupa. In August of the same year the species positively swarmed; and again in October there was a partial brood. There seemed thus very good evidence to show that on that occasion the larvæ lived in this country throughout the winter. The appearance of the species seemed equally uncertain in Germany, and, in fact, throughout the countries of Central Europe, but along the Mediterranean littoral the larvæ fed throughout the winter.

Mr. Tutt referred to *Pyrameis cardui*, and said that although it was stated in entomological works that this species hibernated in the imago stage, he had failed to find any direct evidence of such a fact. There was no record of the species being taken during the winter either in this country or on the Continent. In the 'Entom. Mo. Mag.' Mr. Eaton had reported the larvæ as feeding during the winter in Algeria. No doubt it was the May brood which immigrated to this country. He also referred to *Argynnis adippe*, which authors stated passed the winter as a larva, whereas it was now well ascertained that it remained in the egg state throughout the winter. Mr. Barrett quite agreed with Mr. Tutt

that *P. cardui* came over here in large numbers at times, but he was of opinion that there was no evidence to show conclusively that it did not live during the winter as an imago. While he lived at Haslemere *P. cardui* could always be taken in the late autumn, and again in early spring a few dilapidated specimens put in an appearance. May these not have hidden among dead leaves, in tree-trunks, &c.? In such retreats it would only by the merest chance ever be discovered.

SEPTEMBER 10th, 1896.

W. MANSBRIDGE, Esq., F.E.S., in the Chair.

Mr. A. E. Hall exhibited a gravid female of the large West African ant, *Termes bellicosus*, from Cape Coast Castle. He also exhibited a series of captured *Callimorpha hera*, including one of the terra-cotta coloured variety, all from Newton Abbot. This was considered interesting, as showing that the habitat was more extensive than it was at first supposed to be. Mr. Hall said that he had a specimen taken in the same locality some twelve years ago.

Mr. Lucas exhibited a female specimen of *Platetrum depressum* having the male blue coloration, and a male specimen of *Calopteryx virgo*, having the right fore-wing without the usual pigment, and to all appearances a female wing. He also showed a male and female specimen of *Thamnotrizon cinereum*, a rare apterous grasshopper, from the bank of the Lymington River in the New Forest.

Mr. McArthur raised a discussion on high flat setting, and in doing so exhibited steel pins uniform in length, such as would necessitate no change in the depth of our present drawers, and suitable for species down to small Tortrices. He also exhibited numerous specimens which he had set in this way. In order to have all specimens at a uniform height on the pin, the gauging must be from the top. The length of pin under the body would admit of several labels being attached and easily read without removing the insect. The pins did not develop verdigris. It would be necessary to stage the smaller species on pith or boletus.

Mr. Montgomery exhibited a bred series of *Dianthæcia capsicola* from Eastbourne. One specimen had the sub-marginal line without the usual zigzags, slightly wider and very distinct. The wavy markings exterior to this line generally seen in most specimens were absent in this example.

SEPTEMBER 24th, 1896.

C. G. BARRETT, Esq., F.E.S., Vice-President, in the Chair.

Mr. R. Adkin exhibited living larvæ of *Cyaniris* (*Lycæna*) *argiolus* in *sittâ* on their food, the flower-buds of the ivy. He stated that they fed up very rapidly, and mainly at night. He also exhibited nearly full-fed larvæ of *Aplecta occulta*.

Mr. Filer exhibited a very fine variety of *Enodia* (*Epinephele*) *hyperanthus*, having the white spots surrounded by yellow rings only. The black rings were entirely wanting. It was remarked that this was a hitherto unrecorded variation. It was captured at Halstead, in Essex.

Mr. H. Moore exhibited specimens of *Thelyphonus giganteus*, and contributed the following note:—"The three specimens of a species of *Thelyphonus* I exhibit are from South Florida, U.S.A., where they are known as 'Mule Killers.' Whether they are actually venomous, as Packard says, is at present an unsettled point (their appearance alone would answer for the dread in which they are held). They are, however, credited with the power of giving out a very pungent odour, and it is recorded of an Indian species, *T. rufimans* (Lucas), that 'a spaniel which went too near a living *Thelyphonus* was seriously affected thereby.' Forming a connecting link between the scorpions and the spiders, the Phrynidæ (to which *Thelyphonus* belongs) are of considerable interest to the comparative anatomist." Mr. Moore also exhibited several imagines and the nest of *Polistes annularis* from the same locality.

Mr. Turner exhibited a very varied series of *Noctua xanthographa*, including one with the orbicular and reniform stigmata, both very distinct; a whitish-grey coloured specimen from Kent; a black suffused one from Aberdeen; and a red form from Shirley. He also exhibited a black *Agrotis segetum* from North Kent; two bred specimens of *Acronycta aceris*, with the veining of the hind wings very plainly marked with dark scales; and a specimen of *Triphæna pronuba* with an incipient discoidal spot on the hind wings.

Mr. Montgomery exhibited specimens of *Noctua ditrapezium*, somewhat darker in colour than usual.

Mr. C. G. Barrett exhibited a large number of forms of *Tephrosia biundularia*, for the purpose of showing the great probability of *T. biundularia* and *T. crepuscularia* being one and the same species, and including the following:

1. Var. *crepuscularia* (April forms, brown). 2. Their pro-

geny (second brood), reared by Mrs. Bazett, Reading. 3. Var. *biundularia* (June form, white). 4. Second brood (July, small, brownish white). 5. Long series, varying from brown to white. 6. Long series from South Wales, varying from white to brown, grey, and black. 7. Long series from Derbyshire hills, ranging from white to brown, grey, and smoky black. 8. Very short series from North Ireland. 9. Second brood specimens, varying.

He called particular attention to series Nos. 1, 2, 3, and 4. No. 2, the progeny of the first brood, brown, var. *crepuscularia*, were light. No. 4 were captured specimens and dark, taken in a district where the var. *crepuscularia* was not known to have occurred, but where var. *biundularia* was common as a first brood. As to markings, he could see no radical differences.

After considerable discussion it was decided to bring the matter forward at a future meeting, so that further evidence and exhibits might be brought.

Mr. Carpenter asked if it had previously been observed that the young larvæ of *Euchloë cardamines* would devour any eggs of the species with which it might come in contact. It would also attack the pupa when soft, and eat holes through it. This was not, he thought, from want of moisture, as he was in the habit of keeping his cages moist. He also mentioned that several larvæ had attached themselves for the purpose of changing to pupæ already formed.

Mr. Tutt remarked that *Thecla w-album*, *Aporia cratægi*, and *Zephyrus (Thecla) quercus* were all in some circumstances cannibals.

OCTOBER 8th, 1896.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Ficklin exhibited several species of Lepidoptera set in their natural positions when at rest, thus showing the pattern of the transverse markings better than when the wings were extended. It was remarked that the adaptability of the protective coloration would be much more apparent if some specimens in a series of each species were set with closed wings. Flat boards for setting would be necessary, and close attention would have to be given to the right position of the fore-legs.

Mr. Carpenter exhibited varieties of *Polyommatus (Lycæna) icarus*, one female with an exceptional proportion of red on the margins, and a male with the left hind wing completely



bleached, both from Folkestone; several female specimens of *Pararge megæra*, bred from ova laid by a female from Ranmore Common, having the median bands more or less connected, forming an interrupted broad black band; and a bred series of *Chrysophanus* (*Polyommatus*) *phlæas*, from Abbot's Wood, with well-developed blue spots on the hind wings. Mr. Barrett had noticed a tendency to the banded variation of *P. megæra* in specimens from Wales and Devonshire, and Mr. Frohawk had seen one from Chattenden Woods.

Mr. H. Moore exhibited two species of Orthoptera from Florida, viz. *Romalea microptera* and *Cyrtacanthacris subvittata*.

Mr. John T. Carrington exhibited the specimen of *Calophasia platyptera*, Esp., a species of moth new to Britain, taken by himself three and a half miles west of Brighton, near some old brickfields on the south of Old Shoreham Road, on 14th September, 1896. This species is closely allied to the "Shark moths;" the genus not being included in the recent lists of British Lepidoptera. It is a native of Central and Southern Europe. The larvæ feed upon toad flax, and it is apparently double-brooded, since the first brood occurs in June in the south of Europe, where it is not uncommon. It was described and figured in the November number of "Science Gossip."

Mr. Carrington stated that the genus *Calophasia* was first described by Stephens to include *C. linaria*, which was supposed to be at that time a rare species indigenous to Britain.

Mr. Ashdown exhibited a rare species of Longicorn beetle, *Molorchus minor* from Mickleham, and varieties of *Toxotus meridianus*, including the entirely black form, from various parts of Surrey.

Mr. R. Adkin exhibited a bred series of *Calocampa vetusta* from Sutherland, and a bred second brood of *Acidalia virgularia* (*incanaria*) from Lewisham; the latter emerged in August and early September last, and were by no means small.

Mr. Lucas exhibited a variety of *Pyrameis* (*Vanessa*) *atalanta*, in which the indistinct deep black blotches, which are interior to the red marginal band of the hind wings, had well-marked blue centres. It was captured at Claygate by Mr. H. L. Hearsum of Kingston. This was a type of variation with which members present were not acquainted. Mr. Tutt believed that this variation had not appeared in any of Mr. Merrifield's specimens, which had been bred during his temperature experiments.

Mr. C. G. Barrett exhibited the pupa-skin and cocoon of *Pamphila (Hesperia) comma*, which he had received from Mr. Hamm of Reading, together with some ova deposited on stems of grass by a female while under observation. Mr. Barrett called attention to the rough cocoon of thin white silk garnished with short pieces of grasses and bits of moss, and also to the close resemblance of the pupa to that of a Thorn moth (*Ennomos*). Mr. Frohawk was of opinion that grass was the only food, since the young larvæ kept by him refused absolutely to touch anything but the common grasses. His females also chose grass upon which to deposit their ova. Dr. Chapman suggested that the Pamphilids are usually grass feeders. Mr. Tutt said that the German authorities gave various leguminous plants as the food, and based their statements upon the fact of the species having been bred from these by several collectors. On the Continent the species was exceedingly restricted in its distribution, and he suggested that its food-plant there was one that was not generally common. Both *Coronilla varia* and *Hippocrepis comosa* had been particularly referred to as the pabulum on the Continent. The former of these, however, was an exceedingly rare British plant.

Mr. C. A. Briggs exhibited a species of Hippoboscidæ, which had been taken off a starling, presumably *Ornithomyia avicularia*, which infests many kinds of birds.

Mr. Turner exhibited a living specimen of *Uropteryx sambucata*, taken that day in his garden, and no doubt a specimen of a second brood.

OCTOBER 22nd, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. A. T. Potter, of Whangarei, Auckland, New Zealand, was elected a member.

Mr. R. Adkin exhibited a short series of strongly marked forms of *Hadena adusta*, taken in Shetland during the past summer.

Mr. Ficklin exhibited specimens of *Lupercina cespitis*, bred from larvæ picked from grass stems in the spring. They were small, and he suggested that the proper food was the roots of grass. Mr. Turner said that he had bred a full-sized specimen of the species from a larva which he found when it was three-fourths grown, and which he fed up on grass supplied fresh each day.

An extensive exhibition of *Tephrosia crepuscularia* and *T. biundularia* then took place.

Mr. Tutt showed three drawers of varieties and races; Mr. Henderson, two drawers; Mr. Barrett, the specimens from Reading upon which his opinion was based, and many others from various districts. Mr. Mera, Mr. Auld, Mr. Mansbridge, Mr. Tunaley, Mr. H. Williams, Mr. de Vismes Kane, and Mr. Chittenden also exhibited more or less extensive series, and altogether it was considered that such a comprehensive series of forms of this species had never before been seen at any meeting of entomologists.

Mr. Tutt read a paper entitled "A critical *Résumé* of the arguments for and against *Tephrosia bistortata* (*crepuscularia*) and *T. crepuscularia* (*biundularia*) being considered distinct species." This was in reply to Mr. Barrett's remarks on the subject ("E.M.M.," vol. xxxii, p. 229).

He pointed out that Mr. Prout ("Ent. Rec.," vol. viii) had shown that the more or less double-brooded species occurring normally in March and July should be called *bistortata*, Goetze, whilst the single-brooded species should be called *crepuscularia*. He stated that the difference between the "one species" and "two species" believers was largely a matter of definition, and that if a species can consist of "two distinct races, each with a distinct life cycle, each with a distinct facies, and one of them presenting in addition marked seasonal dimorphism," then *T. crepuscularia* and *T. biundularia*, using the names by which the two insects are generally known, might be considered as one species; if, on the other hand, it be considered that "every group of insects with a distinct life cycle, that breeds true to its own group, has a separate time of appearance, and therefore does not normally hybridize with the members of any other group, constitutes a species, then there can be no doubt that it is utterly illogical to maintain that *T. crepuscularia* and *T. biundularia* are one species." Mr. Tutt pointed out the errors that had arisen from the opinions of entomologists who did not know both species in a state of nature; of those who did not know the peculiar facies of the second brood of *T. crepuscularia*, and of those who had taken for granted the erroneous statements made by various authors, especially those made by Newman in "British Moths." He reviewed the whole evidence offered by the discussion of the subject that took place ten years ago, both in the "Entomologist" xix, and in the "E.M.M." xxiii, and pointed out that there was a consensus of opinion as to the distinctness of the two

species among those who had taken part in the controversy, only three of the writers holding the opposite view, viz. Rev. G. A. Smallwood, and Messrs. R. South and C. G. Barrett. He then critically reviewed the various statements on the subject, and argued that Mr. Smallwood practically gave in all that he had contended for by finally assuming that *T. biundularia* is a species, and *T. crepuscularia* a sub-species, and that Mr. South's remarks ("Entomologist," xix., pp. 269—272), were utterly beside the question.

Referring to Mr. Barrett's remarks ("E.M.M." xxxii., 229), Mr. Tutt went on to say that the assumption that because Mrs. Bazett had never seen *T. crepuscularia* in a certain wood at Reading, therefore it did not occur, was not at all satisfactory, and that as to his statement that the second brood of *T. crepuscularia* were "in markings and colour typical southern *T. biundularia*," the series exhibited by Mr. Henderson, Mr. Mera, and himself were a sufficient refutation. He had no hesitation whatever in referring the specimens obtained by the keeper, who gave them to Mrs. Bazett, to *T. crepuscularia*, and not to *T. biundularia*. He considered that Mrs. Bazett had made a grave mistake in recording second brood specimens of *T. biundularia*. Mr. Tutt then gave a detailed account of Scotch *T. crepuscularia*, of which he exhibited some sixty specimens, and said that they more closely resembled the typical German form than any other British specimens. He referred to the evidence offered by Messrs. Porritt, Tugwell, Fenn, and others, who had bred both species, as to their distinctness, and pointed out broad differences in the shape of the wings, &c. He said that colour was no guide, for although, on the whole, *T. crepuscularia*, var. *abietaria*, was darker than *T. biundularia*, yet some *T. crepuscularia* were whiter than any *T. biundularia*. *T. crepuscularia* gave white, ochreous, fuscous, and black (brown) forms; *T. biundularia* white, ochreous, and black forms. Yet the specimens were always abundantly distinct, and parallelism of colour variation, he considered, would not unite species. Mr. Tutt then pointed out that dates of appearance were misleading if dates of years like 1888 were compared with those of a year like 1893. Third broods of *T. crepuscularia* were then referred to, Mr. Tutt asking members to compare the second broods of the species exhibited by Mr. Mera, Mr. Henderson, and himself with typical *T. biundularia*, and to say whether they were, as Mr. Barrett had insisted, "obviously *T. biundularia*." The differences, in his opinion, were patent when there was



sufficient material for comparison. He stated that those who considered *T. crepuscularia* purely as a larch-frequenting species were in error. It was exceedingly abundant in many woods where larch did not occur. He also pointed out some strange errors that had arisen through the synonymy, and corrected a report in the "Proc. South London Ent. Soc.," 1887, p. 39, which purported to be that of an exhibit that he himself had made. In conclusion, he observed that he had not touched on much ground which would have supported his contention that these were distinct species, but that this was now being worked up by Mr. Hewett, of York, who was engaged in the preparation of a paper on the whole matter.

Mr. Henderson said that he had collected in most of the woods near Reading, and believed he had taken *T. crepuscularia* in the very wood from which Mrs. Bazett's supposed second brood of *T. biundularia* had come, and in which it was stated that *T. crepuscularia* did not occur. He also contributed the following notes:

"I have studied these two species since I commenced to collect twenty-six years ago, and have many examples from all parts of England, and I have repeatedly bred them, from Berkshire, Surrey, and other localities. In my opinion they are easily separated. *T. crepuscularia* exists only in the south of England, and South Wales and Midlands. I have seen few north of the Trent. It is double-brooded in its natural state, emerging in March, April, and July to August. *T. biundularia*, on the contrary, is single-brooded in a wild state, and assumes the imago state in May and June; it has a much wider range, from Kent and Devon to Wales, up to Morpeth and parts of Cumberland.

"I am aware that the late Mr. J. A. Cooper succeeded in rearing a single example of a second brood of *T. biundularia* from larvæ fed on knot-grass, and I have had a third brood of *T. crepuscularia* in one summer, but these are not to be considered altogether natural. Having seen many thousands of both, I would undertake to separate the species, however mixed or arranged, if the specimens have been captured or bred from beaten larvæ. The examples bred 'in and in' are not so easily distinguished, and the black vars. of *T. crepuscularia* from Wales and black *T. biundularia* from Derbyshire have some resemblance; but I think there is no difficulty in distinguishing one from the other."

Mr. de Vismes Kane communicated the following note:

"I send a few examples representative of the range of

variation of the only species I have found in Ireland. Once I committed myself to a record of *T. crepuscularia* here; but I am pretty sure I was wrong, and that it was only a pale specimen of *T. biundularia* taken in April, a female. The three highest specimens in my box are from this county and the adjoining one (Tyrone). Similar specimens are found at Killarney and Sligo (south and west of Ireland). No. 4 is from Killarney; 5, Galway; 6 and 7, Killarney; 8, Tyrone, 26th May.

"The species is rarely to be taken in April, but is abundant early in May, and lasts till mid-June. Perhaps the pale females are more abundant in June, but this I apprehend is because they survive longer than the males. I have taken them in Ulster, in the midland and western counties, Meath, Westmeath, Sligo, Galway, as well as abundantly in the south. There is only one form darker than those I send, and approaches the melanic form taken in England, but is not so dark. It is a dingy blackish brown, slightly marked with the transverse strigæ, and dwarf in size, and is so far only found in a spot on the Mourne mountains (Ulster). There are also occasional specimens with a great deal of yellow in the double median band."

Mr. Barrett proposed, and Mr. Auld seconded, a hearty vote of thanks to Mr. Tutt for his paper.

In his reply Mr. Tutt said that the idea of species was simply a matter of utility. If two distinct life cycles occurred, then it was convenient to call them separate species, although they might be very closely allied.

NOVEMBER 12th, 1896.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. R. Adkin exhibited a long and varied series of *Acidalia marginepunctata*, upon which he contributed notes (p. 108).

Colonel Partridge exhibited two dwarf and very red specimens of a second brood of *Zonosoma linearia*. They were bred, and from Epping Forest; a portion of the brood were lying over. The specimens were also especially noticeable for the development of annulated spots, which are a permanent character of the other species of the genus.

Mr. Tutt said that he had just seen specimens of the same species which had been bred by Mr. Merrifield in the course of his temperature experiments. They were very red, and had

developed the annulus on each wing, but were normal in size. He said that it would be interesting to note the size, colour, and markings of the imagines yet to be bred from the pupæ going over the winter.

Mr. Auld exhibited a specimen of *Zygæna lonicera* from Chattenden, with partially sub-diaphanous wings.

Mr. Lucas exhibited a number of specimens of *Periplaneta australasiæ* from Kew Gardens and Bishop's Waltham, comprising males, females, and immature (wingless) examples. The yellow rim to the pronotum is much more developed in the female than in the male, and this character serves to distinguish the sexes.

Mr. Tutt made the following exhibits, and contributed notes as under:—Specimens of *Orrhodia vaccinii*, two of which bore a close resemblance in coloration to *O. erythrocephala*, ab. *glabra*. The form was not unlike that described as ab. *obscura* ('Brit. Noct.,' iii, p. 3). A series of *Zygæna exulans* from Le Lautaret, Dauphiné Alps, taken during the first week in August. The smallest specimens were from an elevation of about 9000 feet. Those specimens from about 7000 feet to 8000 feet elevation were large; but as the herbage got sparse on higher slopes the specimens became much smaller. This was evidently a case of stunting due to the condition of their food-plant. It was observed that the small males suffered but little as regards depth of coloration, but the females did differ considerably in this respect. Two specimens of *Lithosia lutarella*, of the deep orange type form. This species was found all over the high Alps; the two specimens were from La Grave in Dauphiné, and were captured at about 6000 feet elevation, just below the La Meige Glacier, on August 8th. The habits of the species were most interesting; the males were seen assembling in great numbers during the morning. On one occasion, when a warm drizzle was falling, they were in great abundance, as also were the two yellow species, *Acidalia flaveolaria* and *Cleogene lutearia*. The slopes seemed to be literally alive with these species. *Acidalia ochrata*, both sexes of the large type form; our British form of this species is the *perochraria* of Stephens. The specimens exhibited were taken at Bourg St. Oisans in the Romanche Valley (Dauphiné), at about 3000 feet elevation, in the middle of August. A series of the beautiful *Psecadia pusiella*, a Tineid which he had found in the greatest profusion on the trunks of old sallow, oak, and poplar that grew in a rocky gully at the back of La Grave. The species was seen drying its wings on the grass

beneath the trees, but no trace of its pupa was to be found. This species has much the same habit, and looks very like a large form of *Cerostoma sequella*, to which it is evidently closely allied. The fresh specimens have a lovely pink iridescence.

Mr. Barrett, on behalf of Mr. C. O. Day, of Knutsford, Cheshire, exhibited a series of forms of *Tephrosia biundularia* taken in March and May. It consisted of whitish, brownish, smoky brown, smoky grey, and blackish specimens from both Cheshire and Lancashire. He also exhibited, on behalf of Mr. J. J. F. X. King, of Glasgow, a long series of *Noctua festiva* and v. *borealis*, all taken in Unst, Shetland. They consisted of a complete gradation of forms, from the ordinary northern v. *conflua* to the extreme of the var. *borealis*.

In the discussion which followed, Mr. Tunaley said that in Sutton Park, Birmingham, he had frequently found late *T. crepuscularia* at the same time as early *T. biundularia*.

Mr. R. Adkin read a paper entitled "My Summer Holiday; and what I noted with regard to *Acidalia marginepunctata*, Goze, and the earlier stages of the second brood of *Cyaniris (Lycæna) argiolus*, L." (pp. 108 and 111).

In the discussion which followed, Mr. Tunaley said that the manner of depositing ova by *C. argiolus* reminded him very much of the similar actions of *Lobophora viretata*; when there were few flowers of holly the young larvæ readily fed on the young shoots. In Sutton Park both broods of *C. argiolus* occurred, although there was but little ivy in the Park.

Mr. Tutt remarked on the scientific value of the paper, and said that *C. argiolus* was reported by Mr. Johnson to lay its ova on holly just clear of the perianth, so that when that fell it would be secure. He congratulated Mr. Adkin upon the result of his observations.

Mr. Mansbridge said that he took a worn specimen of *A. marginepunctata* at Folkestone on July 7th; but although he searched every day he saw no more until July 17th, when he took some half a dozen perfectly fresh specimens.

Mr. Tutt said that there were always two broods of this species, and this year he had records of partial third broods in confinement.

Mr. Adkin, in reply to a question, said that the larvæ of *C. argiolus* fed only on the stamens and ovary, and not on the perianth.



NOVEMBER 26th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. P. L. Barnett, of Royal Hill, Greenwich, was elected a member.

The meeting was specially devoted to an exhibition of varieties, and was largely attended.

Mr. W. Mansbridge exhibited numerous varieties of *Abraxas grossulariata*, bred near Leeds, 1892-6; a series showing the variation of *Polia chi*, including var. *olivacea* and fine bred forms from the West Riding; also a series of melanic vars. of *Hybernia aurantiaria*, from Yorkshire.

Mr. C. Oldham exhibited specimens of *Argynnis euphrosyne*, var. (f.w. markings few; h.w., black and distinct), from Epping Forest, 1888; *Epinephele ianira*, var. (light), Epping Forest, 1893, and var. (xanthic), Epping Forest, 1891; *Odonestis potatoria*, var. (putty-coloured), bred 1896, and var. (yellow), bred 1896.

Mr. R. Adkin exhibited local forms of *Boarmia repandata*, including banded and black forms from South Ireland; banded and other forms from North Devon; black forms from Yorkshire; grey from Hebrides and other Scottish localities, together with sundry other forms from various localities for comparison. *Camptogramma bilineata*, English, Scottish, and Irish forms, the latter including some unicolorous black examples. *Amphidasys betularia* from Forres and Yorkshire, including pale, ordinary, and black forms. *Boarmia cinctaria*, pale, dark-bordered, and other forms from South Ireland; *Cidaria corylata* with var. *albocrenata* from Rannoch; and *Thera juniperata*, including very dark banded forms from Orkney. Also a box of varieties of *Abraxas grossulariata*; a long series of *Acidalia marginepunctata* from Eastbourne, embracing pale, grey, and almost black forms; black-banded *Eubolia bipunctaria*; strongly banded *Anaitis plagiata*, and unicolorous dark brown *Ematurga atomaria*.

Mr. Mitchell exhibited specimens of *Saturnia pavonia* (*carpini*). 1. A dark form of the female, bred (Wicken). 2. A gynandromorphous example, bred also from Wicken. *Epinephele ianira*, an entirely fulvous specimen (Abbot's Wood). A form of *Polyommatus phlæas* with large elongate spots almost forming a band (Barnes Common).

Mr. Dollman exhibited a very striking series of *Odonestis potatoria*, bred from larvæ taken at Angmering (Sussex), the females showing a great range of variation; also several

with male coloration; a diminutive example of *Anthocharis cardamines*, and a fine aberration of the same species—the dark tips on the primaries being suffused and extending inwards (Angmering); also two partially bleached forms of *Epinephele janira*.

Mr. Ashdown a series of *Coccinella hieroglyphica*, with the elytra varying from testaceous, without spots, to entirely black, the series being otherwise very variable in the number and shape of the markings. (From Oxshott, 1896.)

Mr. C. G. Barrett exhibited long series of the following species, comprising nearly all the known local forms, viz. *Melanippe hastata*, *M. tristata*, *M. fluctuata*, *Boarmia repandata*, *Eupithecia togata*, *E. extensaria*, *E. sobrinata*, *E. Stevensata*.

Mr. H. A. Auld exhibited two specimens of *Colias edusa*, var. *helice*; one *Zygæna loniceræ* with partially diaphanous hind wings; two black vars. of *Xylophasia monoglypha* from Ireland; four specimens of *Callimorpha hera*, var. *lutescens* (first series known to have been bred from British ova); series of *Spilosoma lubricipeda*, including (1) var. *fasciata*, (2) var. *zatima*, and (3) a number of intermediate forms; two varieties of *Abraxas grossulariata*; one of *Lomaspilis marginata*; one of *Anaitis plagiata* (broad-banded); one of *Spilosoma urticæ* minus the dorsal spot; and four specimens of *Dicycla oo*, var. *renago*.

Mr. Levett exhibited varieties of *Callimorpha dominula*, bred from Deal larvæ, three of them being yellow forms, of which two were bred in 1892.

Mr. Mera exhibited varieties of *Arctia caia*. 1. The usual markings quite displaced by an irregular white patch extending from base to more than half across the wing, with the exception of a few brown spots and a brown dash along the costa. Tips of wings almost normal. Hind wings with only one small spot above the usual row of black spots. 2. The brown colour occupying nearly the whole wing, with only some of the usual white markings indicated. 3. The white markings very much increased, leaving only a few brown markings. Black spots on hind wings very much decreased in size and number. All were bred from Wanstead larvæ. An example of *Abraxas grossulariata*, in which all the spots were blurred and indistinct, giving the insect a somewhat grey appearance, while the usual yellow markings were entirely absent, the white part of the wings being tinged with smoky, from Forest Gate, 1896; a specimen of *Cidaria silaceata*, pale brown, the central band indicated by paler lines, but the enclosed space was

no darker than the rest of the wing, from Morpeth, bred; an aberration of *Hadena thalassina*, in which the usual markings were absent, the whole upper wing being smoky grey with the exception of the lighter line towards the outer margin, from Richmond Park, bred 1896; a specimen of *Arctia villica*, with smoky hind wings, and another example of the same species having the usual markings obliterated, and all the wings smoky black in appearance, thorax black, both from Willesden; an aberration of *Melanippe fluctuata*, with the usual central band reduced to a spot on the costa; a specimen of *Thera juniperata*, from the Surrey Downs, with the band reduced similarly to the last example; and an example of *Brenthis (Argynnis) euphrosyne*, with the centre spots on each wing confluent.

Mr. Henry J. Turner exhibited a long series of vars. of *Hybernia leucophaëaria*, black, suffused, variegated, white banded, narrow banded, broad banded, reddish concolorous, &c.; several distinct geographical forms of *Gnophos obscuraria*, black, brown, white, and grey; a very varied series of *Oporabia dilutata* taken in one day on West Wickham fence, including very dark, light, uniform, and banded forms; a few examples of *Cænonympha typhon* from Carlisle—one specimen was striking in having a submarginal series of well-developed ocellations on the hind wings, together with a white irregular blotch on the discal area of the same wings; and a series of aberrations of *Melitæa aurinia (artemis)* sent to him by Mr. Wilkinson, of Carlisle, including (1) with basal and central area of all wings entirely black; (2) black with but little red and without the submarginal band on the hind wings; (3) an increase in the number and size of the light straw-coloured markings; (4) the red intensified and bright with an absence of the straw-colour; (5) forewings with the straw-coloured blotches of the inner margin united, forming a conspicuous blotch; (6) spots on the submarginal band of hind wings reduced to mere dots; (7) hind wings with an unusually wide submarginal band, the spots being surrounded by faint straw-coloured rings. All were from the neighbourhood of Carlisle.

Mr. Thomas W. Hall exhibited a cabinet drawer containing a row of varieties of *Arctia caia*, including one fine form with almost black hind wings, and others with the black spots on the hind wings uniting and forming a continuous bar; a series of *Arctia lubricipeda*, var. *zatima*, including a specimen taken by Dr. Wheeler at Wicken Fen; a short series of the yellow banded form of *Sesia culiciformis*; a

specimen of *Syrichthus malvæ*, var. *taras*, very large, and dwarf forms of *Polyommatus* (*Lycæna*) *icarus*, from Ireland and Kent; a short series of *Nemeophila plantaginis*, var. *hospita*; a female of *Odonestis potatoria*, with male coloration; a bandless example of *Demas coryli*; a strongly-banded form of *Polia xanthomista*, var. *statices*; two specimens of *Mamestra persicariæ*, var. *unicolor*; a long series of *Tæniocampa gothica*, var. *gothicina*; varied series of *Xylina conspicillaris*, *Cleora viduaria*, *Cymatophora octogesima*, and other species.

Mr. H. Moore exhibited two drawers of exotic Orthoptera, comprising a series of *Locusta peregrina* from Tangier, Red Sea, Persian Gulf, and South-east Africa, showing variation of colour and density of markings; *Pachytylus migratorius*, var. *cinerascens*, from Cadiz; a long series of *Ædipoda fasciata* and its varieties from France, Spain, Switzerland, and Corfu. The following American *Ædipodidæ*:—*Spharagemon æquale*, *S. volli*, *S. collare*, *Arphia carinata*, *A. xanthoptera*, *Hippisius rugosus*, *Encoptolophus sordidus*, *Chortophaga viridifasciata*, and *Aulocara scudderi*.

Mr. Frohawk exhibited a grand series of reversed specimens of *Epinephele hyperanthes*, showing every graduation of ocellation from var. *arete* to the finest examples of var. *lanceolata*. Of the latter form the series consisted of no less than eight fine specimens. The remaining forty-two examples also exhibited great variety in pattern of spots and in the ground colouring. The majority of the specimens were bred by the exhibitor. He also exhibited several forms of *Papilio machaon*, principally showing variation of anal blotches, and an unusually fine dark tawny aberration, bred from Wicken.

Mr. Tutt exhibited a long series of *Melampias melampus* and *M. pharte*, which, from evidence he has recently obtained, appear to be local forms of one variable species, and not distinct species, as was generally supposed; also an extensive series of *Cænonympha iphis* and *C. satyrion*, which had been considered distinct, but which recent investigation showed to be more or less local races of one species.

Mr. Dawson exhibited a male specimen of *Argynnis paphia*, caught in the New Forest this year. A very dark aberration, somewhat resembling the figure 1 c, plate 22, in Mr. Barrett's "British Lepidoptera," except that the body and the wings near the body are of a pale brown colour tinged with green, and the dark colouring velvety black; near the edges of the upper ring the brown shows through in spots; the under side of fore-wings tipped with green, black markings confluent.



Hind wings: black markings confluent except near the margin, where the light brown spots show through a black line parallel with the margin; under side entirely silver, or silver shaded with green.

Mr. Dawson also exhibited an example of *Chrysophanus phlæas*, var. *schmidtii*, taken at Plumstead some years ago, and an aberration of *Taniocampa incerta (instabilis)*; the forewings of this specimen were grey in colour and traversed by dark lines, the central one thicker and darker than the others, but with a paler edge, discoidal spots absent; hind wings silvery grey with dark submarginal band.

DECEMBER 10th, 1896.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Step exhibited the "pen" of the squid (*Loligo vulgaris*), which was very common around Portscatho. These pens were never found on the shore as the "shells" of the *Sepia* are, and it was suggested that probably the *Loligo* met its death by being eaten by some large fish, and that the comparatively soft pen would be more or less destroyed. This squid is in that district used for conger bait, and the mode of its capture is somewhat peculiar. They are caught in the evening with pilchards as a bait. Their suckers slowly cling to the pilchard, and their beak is inserted. Cautiously the fisherman draws the line, and when sufficiently near a bamboo rod, previously fitted with numerous hooks, is used to lift out the squid. Great dexterity must be used or the squid will eject its "ink" full in its captor's face, and produce a very unpleasant burning effect for some time.

He also exhibited from the same locality specimens of the crabs *Xantho incisus* and *X. hydrophilus*, and described their characteristics and differences.

Mr. Brooks, of Rotherham, exhibited a very long series of *Acherontia atropos* bred this year from pupæ obtained at Long Sutton. They included an asymmetrical form, having the right wings paler. Mr. Tunaley said he had bred a similar form this year, and considered that the aberration was probably the result of some injury to the wings during emergence by which a portion of the wing fluid escaped. He noticed that the specimen exhibited appeared to have been injured in this way. He suggested that the fluid served to somewhat intensify the colour, and its being deficient in quantity caused the paler appearance.

Mr. Brooks also exhibited a very long series of *Triphæna*

*fimbria*, bred from larvæ collected around Rotherham. There were only a few very dark specimens, but the majority were light, and a few had numerous white markings. One example had a somewhat broader band on the hind wings, and the basal area was slightly irrorated with blackish scales. Mr. Adkin stated that he had always reared both light and dark forms from any batch of collected larvæ. Mr. Barrett said that this colour variation was not sexual. Mr. Hall had bred the species from ova, and had never found very light and very dark forms in the same brood, and he thought they always followed the parent in colour.

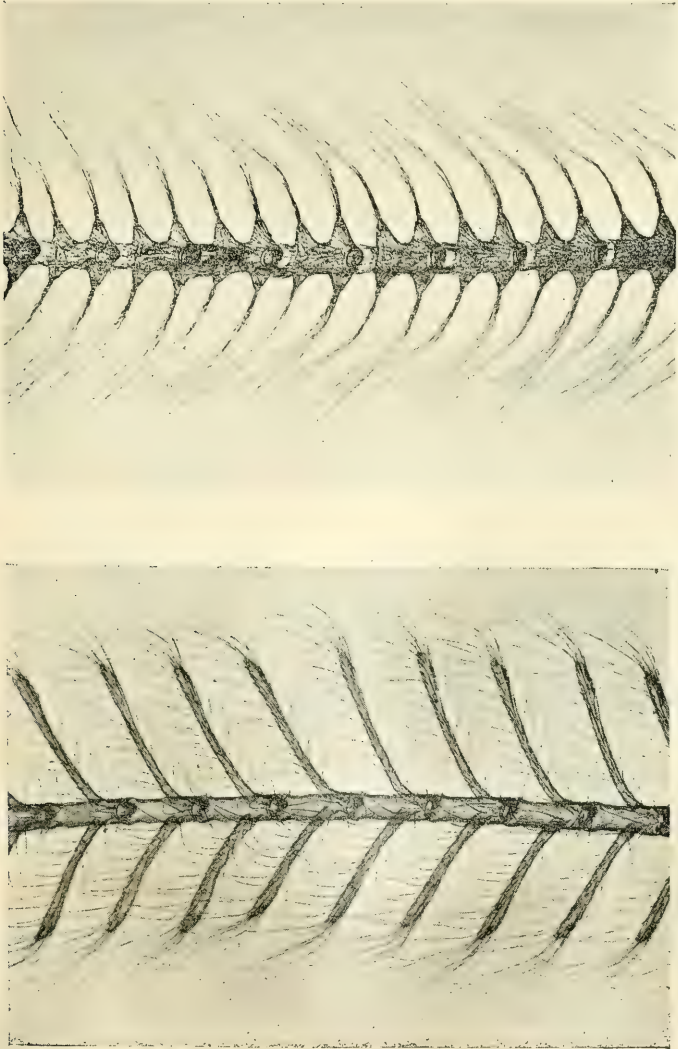
Mr. Mansbridge exhibited a long series of *Agrotis auxiliaris*, taken in the Indian Territory, U.S.A., in 1893, during April and May, and read a short paper on the exhibit (printed page 116).

Mr. Barrett exhibited two specimens of *Agrotis subgothica* belonging to Dr. Mason, and supposed to have been captured by Raddon, of Barnstaple; and also examples of *A. tritici* of the *subgothica* form, mostly from the east coast. Mr. Tutt showed that the *bona fides* of Raddon was open to the gravest doubt, adducing the evidence of Doubleday and others. He was also in favour of accepting the name *jaculifera* of Guenée, although the name *subgothica* had been recognised in America some years previously to Guenée's description. Mr. Barrett said that the shape of the wings, narrow at the base and broad outwards, was sufficient to distinguish *A. subgothica* from *A. tritici*.

Mr. Adkin read a paper entitled "What is the Cause of Melanism in the Scotch Specimens of *Triphæna comes* (*orbona*)?" (page 102). In the ensuing discussion Mr. Tunaley thought that all variation should be looked upon as the result of the action of two classes of forces—creative and selective. His own experience was that Forres and its neighbourhood was a very moist and relaxing area.

Mr. A. W. Dennis exhibited under the microscope male antennæ of *Hybernia aurantiaria* and *H. defoliaria*, and pointed out the great difference between them in the structure of their pectinations. In *H. defoliaria* short conical processes spring from each side of the shaft, their apices being adorned with a number of somewhat long, slender hairs; while in *H. aurantiaria* the processes are long and of equal thickness throughout their length, and have a double row of short hairs springing from their sides. The antennæ of the remaining members of the genus resemble those of *H. aurantiaria* (see figures, page 75).

Mr. R. Adkin exhibited a short series of *Camptogramma bilineata*, from Shetland, the individuals of which were small in size, and showed some striking contrasts with each other, both in colour, which varied from dull yellow to umber-brown, and in markings. One example had the central fascia broad, complete, and of the brown colour with a pale central blotch; while in the other extreme this character was indicated only in outline.



*Hybernina defoliaria.*  
Portions of male antennæ, showing structures,  $\times 40$  diameters. Exhibited by Mr. A. W. Dennis.  
Photographed from nature by Mr. Frederick Clark.

*Hybernina aurantiaria.*

## Some remarks on the genus *Argynnis*, with particular reference to a certain phase of aberration observed in some species of the genus.

By R. SOUTH, F.E.S. *Read Feb. 13th, 1896.*

THE genus *Argynnis* is represented throughout the Holarctic realm (a zoo-geographical division of the globe embracing the Palæarctic and Nearctic Regions of Wallace), and a few species are found at high elevations in tropical countries.

Although it is not the purpose of the present paper to deal at length with the generic subdivision of the species so generally included in *Argynnis*, it may be well to mention that it is only within comparatively recent years that Hübner's divisions of this group have been adopted. Moore, in his "Lepidoptera of Ceylon," resuscitated *Acidalia* for *A. niphe*, thus displacing the well-known Geometrid genus of that name, for which he substituted *Idæa*. Scudder ("Butterflies of New England") revives *Brenthis* for the smaller species of *Argynnis*, and sets up *Speyeria* for the reception of the American *A. idalia*.

The exact number of known species belonging to the genus has not yet been clearly determined, and this in a great measure is due to the fact that authors are not agreed as to the true status of many of the insects, especially of those found in America. However, there are probably somewhere about seventy or eighty distinct species, distributed as follows: Asia, 26; Europe, 22; Central Africa, 1 (*A. hanningtoni*, Elwes). The remaining species are American, including three from Chili (*A. cytheris*, Drury; *A. lathonoides*, Blanch; and *A. modesta*, Blanch).

A consideration of the geographical distribution of the species found in Europe affords some points of interest to the student. The range of no less than twenty-one of these extends into Asia; there is, therefore, only one species which can be said to be peculiar to Europe. This insect is *A. elisa*, Godart, which is restricted to the islands of Corsica and Sardinia. Two of the species inhabit Arctic regions exclusively; these are *A. chariclea* and *A. polaris*, the last-named being met with in the high latitude of  $81^{\circ} 52' N$ . *A. aphirape* and *A. euphrosyne* have each a well-defined boreal form. *A. thore* is an alpine species, but it is also represented in Lapland, the Altai, and Amurland by var. *borealis*; whilst a form of *A. euphrosyne*, sometimes met with in the Alps, is hardly separable from the Arctic form of that species known as var. *fungal*. In its typical form *A. pales* is an Alpine species, occurring at high altitudes



in the Pyrenees and Swiss Alps, but at lower elevations (under 7000 feet) it assumes the forms *isis* and *napæa*; whilst in the Swiss valleys and on the peat bogs of North Germany, as well as in Scandinavia, Northern and Central Russia, it is represented by the very distinct *arsilache*, which is considered by some entomologists to be a good species. This form is, however, connected with the type by var. *lapponica*, which occurs in Polar Europe. Other local forms of *A. pales* inhabit the Caucasus and Greece, and it is represented in the Himalayas by *sipora* and *baralacha*, but many of the Himalayan specimens of *pales* cannot be separated from the Swiss type. At least three species, i. e. *A. aphirops*, *A. chariclea*, and *A. freija*, are known to occur in America, and if *saga* be accepted as a form of *A. frigga*, the number will be raised to four. Two other species, viz. *A. latona* and *A. pandora*, are found in Africa.

Only six of the European species can be regarded as inhabitants of Britain, and all of these have a very wide distribution. *A. selene* and *A. euphrosyne* occur throughout Northern and Central Europe, the former extending eastward into Corea, and the latter into Amurland. *A. aglaia*, *A. adippe*, and *A. paphia* have a somewhat common distribution in Europe, but the first-named is perhaps found further north than either of the others. All three extend into Eastern Asia as far as Japan, and *aglaia* occurs also in the Himalayas, where it is represented by var. *vitatha*. Other forms of *Aglaia*, and also of *adippe* in Eastern Asia are well defined, and have been named and described as distinct species. *A. latona* in its typical form inhabits temperate Europe, Western and Central Asia, and North Africa. In Eastern Asia it is represented by var. *iscea*, and occurs not uncommonly in the Himalayas and in Western China.

Many of the species of *Argynnis* appear to be subject in a greater or lesser degree to occasional aberration in the matter of ornamentation. The most frequent form of variation is an exaggeration or the suppression of ordinary markings. In the one case the black spots on the upper surface, and the silver or yellow markings on the under surface, are enlarged and coalesce, forming more or less complete bands or patches, generally on the central portion of the wing above and the basal portion below. In the other case the black spots on the central area of the upper surface are partially or completely effaced, and on the under side the markings are greatly reduced in size. Aberration of the ground colour is sometimes exhibited, and this may or may not be associated with modification of the markings. The usual fulvous may be highly intensified, or it may be reduced to a buff tint; or, again, it may be heavily suffused with fuliginous. Either of these extremes are, however, rare, and variation in colour does not often extend to anything of a very pronounced character.

To refer in greater detail to the phases of aberration in this genus would be going beyond the intended scope of the present remarks; at the same time there is one form of variation which may be

more fully considered here, and this is the pale patches sometimes seen on one or more of the wings of *A. paphia*.

These pale marks are not by any means peculiar to *paphia*, but occur in several other species of the genus. I have observed them in the following species comprised in Mr. Leech's collection:—*A. sagana*, Doubleday; *A. ino*, Esper; *A. daphne*, Schiffermüller; *A. jerdoni*, Lang; *A. gong*, Oberthür; and I have seen specimens of *A. euphrosyne*, Schiff, and *A. selene*, which exhibit them. It is perhaps noteworthy that although these pale patches are, in all the specimens referred to, placed in identical position on the hind wings, that is, in the second median interspace, they are, as a rule, found on the fore-wings towards apex only in the larger Argynnidæ, and in the second median interspace only in the smaller species. The female *A. paphia*, figured by Mr. Frohawk (Entom., xxvii, p. 97) is, however, an exception to this rule, as it has a pale patch in the centre of the wing interrupted by the second median nervule. In one example also of *A. jerdoni*, in the collection referred to, there is an ill-defined pale longitudinal blotch towards the apex, in addition to some distinct whitish blotches in the median and submedian interspaces; and in a specimen of *A. daphne* the sub-apical pale blotch is larger and more distinct than those on the disc of either fore or hind wings.

In all the cases just mentioned the pale blotches are present on both surfaces of the wings, but in *A. paphia* they are not always equally well defined on all four wings. Sometimes in this species the pale mark is distinct on one pair of wings, and only indicated on or may be entirely absent from one or both wings of the other pair. In other examples the pale mark is well formed on three of the wings, and only slightly in evidence on the fourth.

As we find that several species of *Argynnis* are subject to exactly the same kind of aberration (in the matter of pale patches) it would seem reasonable to infer that in all the species the variation is due to a common cause, be that what it may. It has been suggested, I believe, that these aberrant markings are the result of some kind of injury to the larva or pupa from which the specimens exhibiting such marks are produced. So far as I know, however, no satisfactory evidence has been brought forward in support of this, and we must therefore look in some other direction for a possible explanation. Mr. Frohawk (l. c.) has suggested that, as regards *A. paphia*, these pale spots are ancient characters, and I am inclined to think that this may possibly be the case, not only in this particular species but also in others of the genus.

In male examples of the pale-spotted form of *A. paphia*, and also of *A. sagana*, we find that the sub-apical pallid spots on fore-wings are placed in the same position they occupy in var. *valesina*, and the pale mark on the hind wing of the *paphia* variety is identical in position with that observed in the pale-spotted aberration of *sagana*, which, it should be mentioned, is also a male. The female

of *A. sagana*, at one time considered a distinct species and described as *paulina*, is dull greenish in ground colour, very conspicuously spotted, and banded with white.

*A. sagana* and *A. paphia* both occur in Eastern Asia, but the former would seem to be the commoner species. The form of *A. paphia* (*paphioides*, Butler) occurring in Japan does not differ in any material respect in the male from European examples of the same sex, but the females are intermediate in colour between the typical female of the species and var. *valesina*. In China both forms of the female of *A. paphia* are obtained, but it would seem that *valesina* is the dominant form of this sex in that country.

Looking, then, at the distribution of *A. paphia*, we might assume that it is an older species than *A. sagana*, which only extends westward to Siberia. We might also perhaps assume that *valesina* is the oldest form of *A. paphia*, and should probably be within the realms of reason if we ventured to regard the darkest examples of that form as archaic, not only of *paphia*, but of *sagana*.

If we compare the lighter specimens of *valesina* with female *A. sagana* we shall find that the pale markings on the fore-wings of the former agree in position with the white marks of the latter, excepting as regards the spot in the discoidal cell, but even this is represented in a few examples of *valesina*. On the hind-wings, however, comparison must be confined to the outer marginal area, and here we see that the white markings of *sagana* are represented in *valesina* by pale ones.

As a working hypothesis, let us suppose the ancestral form of *Argynnis*, from which *paphia* and *sagana* have descended, to have been something like the darkest example of *valesina* now extant; and let us further suppose that we can, in imagination at least, follow the process of evolution, which has resulted in the development of *sagana* and what we call typical *paphia*. Among the various modifications occurring in the specialisation of each there probably was a stage when, in the male of *sagana* and both sexes of *paphia*, the typical colour of to-day began to appear. Possibly the pale sub-apical dashes on fore-wings, and the pale patches in second median interspace of hind wings, were the last to disappear, giving place to the encroaching fulvous colour; and it is perhaps to this stage that the aberrant specimens under consideration have reverted.

Of course it may be possible that these aberrant characters in *paphia* are progressive rather than retrogressive; but if this were so we should hardly find them normally indicated in what is presumably the older form of the female, *i. e.* *valesina*, and only rarely present in what we have reason to believe is the newer form of that sex.

Although I do not insist on the pale patches being ancestral characters, I am inclined to consider that such a conclusion is not altogether unsupported by the facts to which I have briefly adverted.

## Additional Notes on the Hymenopterous and Dipterous Parasites bred by the Members of the South London Entomological and Natural History Society during the years 1891 and 1892.

By T. R. BILLUPS, F.E.S. *Read Feb. 27th, 1896.*

IN this, my third paper dealing with the parasites reared from Lepidopterous hosts by the members of the South London Entomological Society, we have some very valuable material collected during the years 1891 and 1892, throwing light upon the life-history of 125 parasites of Lepidopterous larvæ not previously referred to.

I hope that many members, more particularly the younger ones, may be induced to follow the example of those gentlemen who have hitherto rendered such valuable aid, and that, at a not very distant date, we may be enabled to largely extend the list of these interesting parasites. The arrangement of this list is slightly different from that of previous ones. The names of the collectors are here enumerated alphabetically, and followed in each case by the names of the hosts and parasites bred therefrom. Commencing with my friend Mr. Adkin, to whom falls the lion's share of thanks—indeed, I owe him a deep debt of gratitude for his valued help,—even the most minute species have not escaped his observation. His first host was *Cedestis gyssemiella*, Dup., from which both sexes of a very pretty Cryptida, *Hemiteles bicolorinus*, Gr., was bred. This was followed by *Arctia caia*, L., from which no less than fifty-two specimens of *Apanteles caia*, Bouche, were bred. This curious little species of Braconidæ, although gregarious, is not at all common. Another species of Braconidæ, equally rare, was bred from the larvæ of *Trochilium bembeciformis*, Hb., namely, *Bracon mediator*, Nees, Mr. Adkin rearing eight males and two females. This species had hitherto only been bred from the larvæ of *T. apiformis*, Clerk. From the larvæ of *Lithocolletis vacciniella*, Scott, from Rannoch, Mr. Adkin bred another rarity, *Apanteles contaminatus*, Hal. This species of Braconidæ had hitherto only been recorded by Mr. W. H. B. Fletcher, who bred it from an undetermined Tineid, mining the leaves of *Arctostaphylos uva-ursi* (the bearberry). The larvæ of *Nepticula weaveri*, Doug., produced both sexes of *Apanteles xanthostigmus*, Hal.; while from the larvæ of *Retina pinicolana*, Dbl., both sexes of *Orgilus obscurator*, Nees, were bred. Two males and one female of a true Ophionid, *Mesochorus confusus*, Ratz., were bred from the larvæ of *Cidaria sagittata*, Fb., and a solitary female of the somewhat rare Bracon, *Meteorus pallidipes*, Wesm., resulted from the larvæ of *Pædisca sordidana*, Hb. At the same time the larvæ of *Pædisca semifuscana*, St., from Derry, produced numbers of both



sexes of *Apanteles emarginatus*, Nees. Mr. Adkin's larvæ of *Retinia resinella*, L., from Forres; yielded both sexes of the very handsome Pimplid, *Perithous varius*, Gr. The larvæ of *Laverna epilobiella*, Schr., produced three distinct species of parasites, four males of *Orgilus obscurator*, Nees, and both sexes of *Microdus tumidulus*, Nees, Ophionidæ being represented by a male and female *Limneria cerophaga*, Gr.

Taking the species in order as they came into my possession, *Peronea maccana*, Tr., is the next host to be referred to, and from the larvæ of this lepidopteron Mr. Adkin was, from my point of view, fortunate enough to breed no less than seven distinct species of parasites, the Tryphonidæ being represented by two males and one female of *Exochus carbonator*, Gr.; four other species belonging to the Braconidæ, namely, three females and one male of *Mesochorus thoracicus*, Gr.; one female of *Eubadizon extensor*, Linn. (this latter species I had previously bred from the galls of *Cynips kollari*, Htg.); three females and two males of the very fragile *Meteorus leviventris*, Wesm., and both sexes of *Meteorus ictericus*, Nees; Chalcididæ being represented by a number of the lovely *Colas dispar*, Nob.; and last, but not least, a single female dipteran, *Degeeria pulchella*, Mgn. Only two examples of this rare fly have hitherto been recorded. These were captured at Glanvilles Wootton, and are in Mr. Dale's collection, our specimen being the first recorded as bred in this country. A very fine female *Pimpla gravenhorstii*, Tasch., was bred, but Mr. Adkin could not be certain of its host. *Psodos coracina*, Esp., from Rannoch, produced two females and one male of the very fine Ophionid, *Anomalon cerinops*, Gr.; while a solitary female of *Meniscus bilineatus*, Gr., was bred from *Retinia pinicolana*, Dbl. The same species of larvæ produced also two males and one female of *Ichneumon fugitivus*, Gr.

Next in order of arrival were several specimens of both sexes of the pretty little *Dacnusa senilis*, Nees, from larvæ of *Retinia pinivorana*, Zell., from Forres. This latter species of ichneumon is a parasite on Diptera, hence it is most probable that some of the larvæ of *R. pinivorana* had been attacked by a dipterous parasite. *R. pinivorana* also produced two females of *Pimpla ruficollis*, Gr. From the larvæ of *Euchelia jacobææ*, L., both sexes of the Bracon, *Microdus tumidulus*, Nees, were bred. We have only one record of this insect having been previously bred, Mr. W. H. B. Fletcher, of Worthing, having reared a male from the larva of *Ptocheuusa inopella*, Zell. Another, but apparently much rarer, *Microdus* was bred from the pupæ of *Pædisca sordidana*, Hb., which produced two males and five females of *M. clausethalianus*, Ratz. The larvæ of *Eupithecia helveticaria*, Bdv., from Rannoch, produced four species of parasites, the first three being true Ichneumons; the first to arrive were two males and one female of the very fine *Anomalon clandestinum*, Gr., quickly followed by four females of *Ichneumon fabricator*, Fab., which proved to be the uncommon var. *pyrrhopus*, Ste. The

following post brought me three grand specimens, females, of one of our handsomest species of Ichneumonidæ, namely, *Ichneumon octoguttatus*, Gr.; but Mr. Adkin was not content with Ichneumonidæ, for the following morning he sent me on from the same host a pair of dipterons which proved to be the rare *Exorista gnava*, Mgn. For this pair of flies I am extremely thankful, as we have only two previous records of it: some years since Mr. Bignell bred a pair from the larvæ of *Orgyia pudibunda*, L.; Mr. Dale also possessing a single specimen bred from the same host. The next to produce a Pimplid were the larvæ of *Tortrix palleana*, Hb., from which two males and one female of *Glypta bicornis*, Desv., were bred. *Agrotis ashworthii*, Dbl., produced four distinct kinds of parasites, firstly three females of the very rare *Phæogenes imbellis*, Gr., and two males and one female of the very handsome *Bassus pectoratorius*, Gr., followed by two species of Diptera. Here again Mr. Adkin has been fortunate, for of the first species, *Exorista affinis*, Fln., of which there were two females, we have no previous record of it having been bred in the British Isles, and the fly itself has only been known to us by typical specimens from the Continent. The second species, represented by an example of each sex, was *Exorista iota*, Mgn. This species is again extremely uncommon, and was hitherto only known from one bred by Mr. Bignell and one by Mr. Fitch; the former from *Acronycta psi*, L., and the latter from *Acronycta tridens*, Schiff.

From the larvæ of *Sesia scoliiformis*, Bork., only two species of parasites were bred, *Rhogas reticulator*, Nees, several specimens of both sexes, and a single male and two females of a very fine Pimplid, *Lissonota sulphurifera*, Gr. The larvæ of *Odonestis potatoria*, L., produced no less than five distinct species, namely, two of Ichneumonidæ and three of Diptera; the first to arrive being a very fine female of *Amblyteles occisorius*, Fab.; this being quickly followed by two males of *Glypta flavolineata*, Gr. The three species of Diptera were *Sarcophaga agricola*, Meig., *Sarcophaga melanura*, Meig., and *Tachina larvarum*, L., both sexes of each species. The next I received were two females and one male, of certainly the most beautiful of the Pimplidæ, *Schizophyga tricingulata*, Gr., reared from larvæ of *Heliothis dipsacea*, L., received by Mr. Adkin from Essex. Two very fine females of *Anomalon cerinops*, Gr. were also bred from larvæ of *H. dipsacea*, and from pupæ of *Spilosoma fuliginosa*, L. three males of *Phygadeuon nycthemerus*, Gr.

Mr. Adkin also sent me both sexes of *Pimpla nucum*, Ratz., which he had bred from a lepidopterous larvæ from Howth, feeding in thistle stems. Mr. Adkin's contributions show the highly respectable total of forty-nine species of parasites, comprising forty-two Ichneumonidæ and seven Diptera, the lepidopterous hosts numbering twenty-four species. Including those referred to here, Mr. Adkin has sent me altogether a hundred species of parasites.

Our member Mr. H. A. Auld contributed one species of Braconidæ, viz. the rare *Meteorus pulchricornis*, Wesm., the host being *Thecla betulæ*, L. Mr. Barker sent two males and one female of the very handsome *Amblyteles subsericans*, Gr., reared from larvæ of *Odonestis potatoria*, L. These were quickly followed by two females of *Limneria ruficincta*, Gr., from pupæ of *Anarta myrtilli*, L.; while from the larvæ of *Thera variata*, Schiff, several specimens of both sexes of *Limneria femoralis*, Gr., were bred. Mr. Barker's last addition was a dipteran, *Exorista iota*, Meig., from the larvæ of *Acronycta psi*, L. This rarity Mr. Adkin had previously sent to me from *Agrotis ashworthii*, Dbl.

I now deal with species reared by myself. Of *Meteorus versicolor*, Wesm., perhaps the prettiest of the whole of the known Braconidæ, I bred two females from a cocoon found attached to a black currant bush in my garden at Peckham. From the pupæ of *Smerinthus populi*, L., both sexes of *Apanteles difcilis*, Nees, were reared in some numbers; the larvæ of *Vanessa urticæ*, L., produced both sexes of the pretty little *Microplitis tristis*, Nees, while from several larvæ of *Pieris brassicæ*, L., large numbers of the omnivorous Braconid, *Apanteles fulvipes*, Hal., were bred in both sexes; another host of this parasite was the larva of *Triphana orbona*, Hufn. When the larvæ of this parasite are fully grown they proceed to spin their cocoons on the body of the dead caterpillar which has served them as host, and sometimes there are as many as thirty-eight to forty in a brood. But the average number is about twenty, the period in the pupa state lasting about a fortnight. In the present case all had assumed the perfect state in thirteen days from their emergence from the caterpillar. From the pupæ of *Cidaria picata*, Hb., I succeeded in rearing a single male and female of the large and handsome *Cryptus dianæ*, Gr.; these were closely followed by a single male of *Ichneumon periscelis*, Wsm., its host being the larva of *Spilosoma fuliginosa*, L.

The next in order to appear were both sexes of a very showy ichneumon, *Amblyteles palliatorius*, Gr., from the larvæ of *Cucullia verbasci*, L.; and on the same day that these insects emerged I was fortunate enough to rear two specimens of the very fine Tryphonid *Mesoleius rufus*, Gr. This handsome species, although not bred from a lepidopterous host, is certainly worthy of mention. The cocoon from which they were reared was that of a saw-fly larva, *Trichiosoma lucorum*, Thoms., and was kindly presented to me by my friend Mr. Adkin, who had received it from Scotland.

The next species bred was *Apanteles fraternus*, Reinh., in some numbers of both sexes, its host being the larva of *Boarmia repandata*, L. This curious species of Bracon is particularly prolific, as many as 100 larvæ emerging from a solitary victim. A larva of *Cucullia verbasci*, L., yielded the very rare Braconid, *Microplitis doleus*, Marshall, in both sexes; closely followed by three males and five females of *Microplitis vidua*, Ruthe., the victim in this case

being the larvæ of *Macaria liturata*, Clerck. This insect has only been bred twice before, first by Mr. Bignell from *Tæniocampa incerta*, Hufn., and last season by myself, but the host was unknown. Another dipterous, the common species *Musca corvina*, L., was bred in considerable numbers from the pupa of *Odonestis potatoria*, L. Both sexes of another but much scarcer dipterous were bred from the larvæ of *Triphæna fimbria*, L., the species being *Pyrella cadaverina*, L.; while a third, bred in both sexes, is, according to my friend Dr. Meade, extremely rare, and had only been recorded as reared twice before, once by the late Mr. Cooke, of Bowdon, from *Botys verticalis*, Schiff, and once by myself from the larva of *Plusia festuæ*, L., the species I allude to being *Nemoræa floralis*, Flin., having for its host on the present occasion the pupa of *Saturnia pavonia*, L.

I am very pleased at this point to pay a tribute to the memory of my late friend Mr. Wellman, who I find on reference to my diary had also bred *N. floralis* from the larva of *Porthesia similis*, Fues. I regret that I accidentally omitted this from my 1888 list. I cannot help thinking that this fly is not so rare as Dr. Meade suggests, for I find a little later on that I again bred it from the larva of *Pieris brassicæ*, L. With one other species of Ichneumonidæ I terminate my list, viz. the very cosmopolitan species, *Pimpla scanica*, Vill., its host being *Noctua brunnea*, Fb.

Mr. Croker sent me the following species, and, strange to say, the whole of them belong to the family Braconidæ. From the larvæ of *Cidaria testata*, L., Mr. Croker bred three distinct species:—*Microplitis spectabilis*, Hal.; this species, although considered scarce, does not confine itself to a lepidopterous victim, for in Mr. Bridgman's collection there are several of both sexes, reared by Mr. Norgate from larvæ of the saw-fly *Trichiosoma betuleti*, Kl.; both sexes of *Microplitis tuberculifera*, Wesm.; and *Apanteles bicolor*, Nees, in considerable numbers. The last-named parasite, although very abundant, does not usually attack the larvæ of the Geometræ, but mostly confines itself to the leaf-mining Tineæ. The larva of *Tortrix sorbiana*, Hb., was the next victim, and from it numerous specimens of the very curious and gnat-like *Macrocentrus linearis*, Fab., were bred. Mr. Croker's last species was the very handsome but common *Meteorus pulchricornis*, Wesm., from the larva of *Thera variata*, Schiff.

Mr. Carpenter has only one species to record, although doubtless he has, like others, thrown a number away. The species I allude to is the very handsome *Cryptus tricolor*, Gr., reared from the larva of *Plusia chrysitis*, L.

Mr. Cook also is only credited with one species, *Microplitis ocellatus*, Bouché, which he bred in considerable numbers. This is a very common parasite of the hawk-moths, and in this case was bred from the larvæ of *Smerinthus ocellatus*, L.

Mr. C. Fenn follows with a much more formidable list, commencing with the larvæ of *Tortrix cratægana*, Hb., from which he



bred the pretty and fragile *Macrocentrus thoracicus*, Nees. The pupa of *Odonestis potatoria*, L., was held responsible for producing several of both sexes of a very beautiful Pimplid, *Polysphincta varipes*, Gr., as also several females of *Pimpla scanica*, Gr., as well as both sexes of *Pimpla graminella*, Schr.; and as though this host was not satisfied with introducing three species of Pimplidæ, we have again another in the very rare and beautiful species *Acrodactyla madida*, Hal. Mr. Fenn's next larva, suffering grievous injury, was *Eupithecia expallidata*, Gn., from which were reared both sexes of *Limneria incrassata*, Holmgr.; while *Eupithecia absinthiata*, Clerck, produced several of the very charming little *Perithous varius*, Gr. From *Brephos parthenias*, L., Mr. Fenn reared two species of Braconidæ, namely, *Rhogas bicolor*, Spin., and *Meteorus versicolor*, Wesm., the latter species being especially numerous; Mr. Fenn's last parasite-producing larva being *Teniocampa miniosa*, Fb., from which a small company of both sexes of *Microplitis tuberculifera*, Wesm., emerged.

Mr. Frohawk is only credited with one species, the very lovely Chalcid, *Colas dispar*, Nob., which he appears to have bred in abundance from the pupæ of *Melitea aurinia*, Rott.

Mr. Hawes has the honour of breeding one of the finest species of Ichneumonidæ in the British list, viz. *Amblyteles oratorius*, Fab., its victim being the larva of *Gonopteryx rhamni*, L. This was closely followed by large numbers of the curious little Bracon, *Macrocentrus pallipes*, Nees, having for its host the larva of *Vanessa atalanta*, L.

To Mr. Mansbridge I am indebted for several fine specimens of Ichneumonidæ, and also several dipterons, as follows:—From the larvæ of *Mania typica*, L., two fine females of the very uncommon *Ichneumon lepidus*, Gr. (the var. *fallax* of the same author), a male and female of *Ichneumon saturatorius*, Linn., also both sexes of the very handsome *Amblyteles litigiousus*, Gr.; the same species of larvæ being responsible for several of both sexes of that common dipterion, *Exorista vulgaris*, Flin. The next to suffer great injury was the larva of *Abraxas grossulariata*, L., from which emerged numerous specimens of the last-named dipterion. *Microgaster minutus*, Reinh., the smallest species of the genus, and not at all a common parasite, was reared in fair numbers from the larvæ of *Cleoceris viminalis*, Fb., from which also two males and three females of the pretty little *Limneria exareolata*, Ratz, emerged; and lastly, three males of the extremely scarce *Sagaritis incisa*, Bridg.

Mr. Nevill contributes one species in the family Ophionidæ, namely, a male and two females of *Ophion luteum*, Linn., bred from the larvæ of *Dianthæcia capsicola*, Hb.

Mr. Short sent two species of parasites, one a dipterion, and the other a true ichneumon; the first-mentioned being *Gonia trifaria*, Zeller, its victim being the larva of *Hadena pisi*, L. This fly, according to Dr. Meade, is extremely rare; it is in Miss Prescott

Decie's collection, and also in my own. My specimen was taken in my garden at Dulwich. Strange to say, all the specimens are males, the female of this species not being known. From the larvæ of *Acronycta myricæ*, Gm., he reared a male and female of *Ichneumon fuscipes*, Gmel.

Mr. J. A. Symes comes next with one species of parasite, the very pretty Chalcid, *Eulophus damicornis*, Kirby, thirty-two specimens of which emerged from a single pupa of *Demas coryli*, L. This little Cynipid, although so minute, is one of the most brilliant of the Chalcididæ.

Mr. South, from the larvæ of *Teniocampa pobuleti*, Fb., from Hereford, had large numbers of the little *Macrocentrus linearis*, Nees, emerge, and the same species was reared from the larvæ of *Phycis betulæ*, Göze, as also were four specimens of the very rare *Agathis nigra*, Nees. The last-named has only once before been recorded, Mr. Elisha being fortunate enough to breed it from *Eupæcilia roseana*, Haw. A little later on I find the larvæ of *Phycis betulæ* again credited with three more distinct species of parasites, viz. both sexes of *Pimpla stercorator*, Fab., *Cteniscus sexcinctus*, Gr., and a male and two females of the exceedingly rare *Sphécophaga vesparum*, Curt. *Oxyptilus teucarii*, Greening, produced several examples of both sexes of *Limneria crassicornis*, Gr.; and the larvæ of *Anarta myrtilli* yielded *Limneria ruficincta*, Gr.; and *Limneria uncinata*, Holmgr., was bred from the larvæ of *Acipitilia galactodactyla*, Hb.

To our friend the late Mr. Tugwell I am indebted for a fine female of *Macrocentrus marginator*, Nees, its host being *Sesia sphegiformis*, Fb.; and also a male and two females of *Ichneumon xanthorius*, Forst., var. *flavoniger*, Gr., bred from *Acronycta myricæ*, Gn.

Mr. Turner swells the list with three species of parasites, the larvæ of *Thera variata*, Schiff, being charged with the whole of them. The first, a dipteran, *Sarcophaga nurus*, Rond., is not at all a common insect; of this there were a male and a female. Of the rarer Braconid, *Microplitis vidua*, Ruthe, there were several examples. Previously there were only three recorded British specimens of this insect: the first, a male, taken by Mr. Marshall in Leicestershire; the second, a female bred by Mr. Bignell from *Teniocampa incerta*; and the third, a male by myself, but I am uncertain of the victim. Mr. Turner's third parasite was the minute but very pretty Chalcid, *Copidisoma cidaria*, Fav., of which there was a large number of both sexes.

From the late Mr. Vaughan I received a small female of *Lissonota segmentator*, Fab., reared from one of the Psychidæ, but in my carelessness I omitted to note down either genus or species.

To Mr. West, of Streatham, I am also indebted for five specimens, including both sexes, of *Lissonota bellator*, Gr., but I have no memorandum of the name of the host.

Mr. Winkley follows next with three species of Ichneumonidæ from

as many different hosts, the first victim being the larva of *Smerinthus ocellatus*, L., from which Mr. Winkley reared probably the largest species of ichneumon in the British list—a fine male *Trogus lutorius*, Fab. ; while the pupæ of *Pieris brassicæ*, L., produced large numbers of the lovely little Chalcid, *Eulophus pectinicornis*, Linn., and the larvæ of *Geometra papilionaria*, L., numbers of both sexes of the gregarious Bracon, *Apanteles rubripes*, L.

Mr. Herbert Williams sent me five distinct species of parasites, from two hosts only, the first being the larvæ of *Thecla betulæ*, L., from which were bred a male and female of *Campoplex insignitus*, Foerst ; the larvæ of *Euchelia jacobææ*, L., being responsible for two species of Ichneumonidæ and two of Diptera, the two former being true Bracons,—the first a solitary parasite, *Apanteles sericeus*, Nees ; the second the rarer *Microgaster globatus*, Nees, which also appears to be solitary. The Diptera were both sexes of *Musca corvina*, F., and *Exorista vulgaris*, Fln.

Mr. Young, of Rotherham, reared both sexes of *Zele testaceator*, Cur., from the larvæ of *Xanthia citrigo*, L. This parasite is extremely scarce, and so far as I know has only once before been reared in this country. Mr. Adkin bred two males and one female in 1887 from the larvæ of *Eupithecia coronata*, Hb.

## Life-history of *Cicindela campestris*, the Common Tiger Beetle.

By FRED ENOCK, F.L.S., F.E.S. *Read March 26th, 1896.*

The common Tiger Beetle *is* so common an insect that most collectors are satisfied to possess a series with which to start the heading of their collection of British Coleoptera, which nine times out of ten is merely a collection of pinned specimens, the chief and growing interest being in the number of drawers filled, *not* in filling our minds with stores of interesting facts in the life-history and economy of these creatures.

By this over-collecting of specimens, to the exclusion of facts, the entomologist loses his greatest privilege. It is most gratifying to know that the members of the South London Entomological and Natural History Society are doing good work among the Lepidoptera, but the field for work among the other orders is still waiting for *earnest* workers. The year 1897 will be a memorable one for all kinds of good works. Why should not entomologists put their shoulders to the wheel, and commence working out life-histories of insects which will be handed down in company with all other wonders of the year ?

For the past seventeen years I have been noting down facts as observed in the life-history of *Cicindela campestris*, which in company with other insects has gradually formed into a complete chain. Each one of the thirty illustrations which I shall show upon the screen I have drawn from nature, and while so engaged I have felt that no entomologist can possibly enjoy to the full measure the pleasure of studying these creatures until he *or* she has placed an insect under the microscope, and determined, in spite of all imaginary inaptitude for such work, *to make a drawing* of each part. The power soon comes with perseverance and repeated failure; but the immense pleasure and delight felt by having the image stamped upon our mind in indelible characters fully compensates for all trials.

The tiger beetle is well named, resembling the royal quadruped in the beauty of its external splendour, as well as in its ferocity of character. Both use their discretionary power when retreat seems the best thing to do; but if otherwise, our small six-footed friend can face an enemy, and show as well as *use* its teeth, this last act being accompanied by a gratuitous supply of perfume—*not* an unpleasant one. On bright sunny days in March and April this beautiful beetle delights to roam over a sandy common, such as that dear to Londoners, viz. “happy Hampstead,” where in certain parts they are very common. As all entomologists know, the elytra are brilliant green when seen in certain angles of light; the small ruddy spots aid the beetle very much by protective resemblance to its environment. I have frequently watched one “pitch” on to a patch of moss, whose terminals are tipped with ruddy leaves, the resemblance of the colours being so much alike that it is most difficult to detect the beetle at a glance. Those who desire to see the ovipositor in use must lie low on the ground with opera-glasses focussed. This is *not* pleasant work in such a public resort as Hampstead Heath, and many years pass before one is able to chronicle such an observation; but when it *has* been made, it proves the perfection of every part of the beetle, from its head to the tip of its tail. The ovipositor is about three sixteenths of an inch long by one sixteenth diameter, armed at each side of the tip with a pointed trowel-like organ, which can be brought to form one point, with which a minute hole is made in the sand, and gradually worked down until a depth of three sixteenths of an inch is reached, when an oval egg, one fiftieth of an inch long, is laid at the bottom, the beetle repeating this process in holes within quite a small compass, frequently one hole running down within a quarter of an inch of another. The tiny “tiger grub” asserts itself as soon as born. The life of the larval stage occupies from two and a half to three and a half years, a full-grown larva measuring one inch and a quarter in length. Many years ago I was passing over Woking Common, when my attention was attracted by seeing a number of small holes suddenly appear in the sand, and standing still for a minute, these holes were filled up again by some living creature rising from beneath. On moving all



the holes appeared again. I then drew out from my pocket an ordinary fern spud, and drawing my arm well back and measuring my distance, I waited until the holes filled up again; then suddenly lunging out my trowel, I drove it a few inches below and across one of the holes, intending to cut off the retreat of the insect. In this I was more than successful, for I found on turning up the sand that, besides cutting off its retreat, I had also cut off its head!—the *tail* evidently went on its way below.

After a few failures I managed to dig up some perfect specimens, which I turned out on to the surface and examined, when I saw that I had before me a most extraordinary larva,—in fact, quite a comical-looking one,—about an inch and a quarter long; a huge head, sloping forehead, three villainous-looking eyes at each side, the mandibles turned *up* instead of down, looking like the horns of a cow; on the slightest provocation these sharp-pointed jaws were snapped together in a very threatening manner. The *chin* was most hugely developed, giving the larva the appearance of suffering from “mumps.” The thorax was surmounted by a large semicircular plate, followed by two smaller ones, the abdomen being white and flaccid, covered with tubercles surmounted by stiff hairs. The fifth abdominal segment was produced dorsally into a large hump, having at its summit two short vertical spines, and in the front of these were two longer and curved spines, somewhat hooked at the points. These converged slightly towards the centre and then diverged again, bending down towards the fourth segment; the anus covered with a number of stiff spines. On touching the tail the grub immediately turned its head back over its body, and with its mandibles seized its tail for a few moments, then suddenly releasing its hold it sprang a distance of ten or twelve inches.

I at once saw that the larva possessed extraordinary mobility in its neck, but for what purpose I at first could not attempt to decide, neither could I determine the purpose of the complex structure of the fifth abdominal segment. I obtained a large number of larvæ of all sizes, which I placed in a strong box filled with sand taken from Hampstead Heath, which process afforded me much amusement at the cost of one of the Heath policemen, who thought he had found a case of “removing the sand.” He kindly informed me of a piece of stale news, in that he “had been watching me for some days!” (and I had been returning the compliment); but *he* was a “new policeman,” and did not know my habit of obtaining permission from Spring Gardens *before* I commenced operations.

In this box I made holes three inches deep by a quarter of an inch diameter, then turned out a larva, which after endless trouble I managed to *back* down one of the holes, over which I placed the lid of the pill-box; then another, and so on, until some two or three dozen were “holed.” Next morning several of these had excavated and escaped from the holes, met on the field, and engaged in mortal combat.

After a time I had increased the number of my "tigers" until I had over a hundred to look after. Most of them soon settled down comfortably in their new abodes, which were made to their liking, and thoroughly done up by each of the tenants, which, when thoroughly settled, did not attempt to leave their burrows, but "sat" at the top enjoying the sun and any stray insect which I turned in. I turned one or two out on to the surface to watch their proceedings. They seem quite lost when so exposed, and some commenced to excavate by shovelling out the sand with their bent and turned-up mandibles, which, in conjunction with the receding forehead and mobile neck, form a very handy shovel; and after a few minutes' work the head is soon out of sight, the sand being forced up continually. I was desirous of observing the purpose of the spines on the fifth segment, but after endless watching I never once saw that they were used for supporting the larva when *excavating*. This was done by the *legs* alone, the sharp-pointed claws being driven deep into the sides of the burrow. As the depth increased the tail gradually disappeared, but the sand continued to be sent up. At last there was a tremendous upheaval, the sand falling all around the closed hole, when suddenly the head appeared acting like a ram, the sand being brought up on the crown. Again descending, other loads were brought up to the level, when the head would poise for a moment, then suddenly it was jerked back, and the sand shot off and away to a distance of nine or ten inches. This movement showed to me the purpose of the mobile neck. I was so delighted at this discovery that I assembled all folks in the house to come and see the great shooting tiger larva; and no visitor ever called but went away perfectly charmed by the sight, for the hole had been finished, and I had only to drop down a small pebble of quartz and watch, when soon the larva would be seen rising up in the hole with the pebble between its mandibles. As soon as it reached the top it paused a moment, balanced its load, and in a second away the pebble flew to a distance of a foot, and at the same moment the larva disappeared down its burrow. The next advance was made in noting the wonderful way in which the countersunk excavation was made at the top of the burrow. I observed a larva rise in the hole, and with its jaws bite out pieces from around the edges; these it jerked away. Then after it had roughly made the pitfall entrance it raised its head well out of the top, and with its hugely developed convex chin and mobile neck *hammered* into the concavity until it was perfectly smooth all round! On cutting an exact section through the centre of such a finished pitfall, I found the curve of the concavity to *exactly* agree with that of the creature's chin! After everything had been finished the larva would rest at the top of the burrow, the large thoracic semicircular plate occupying one half, while the head and mouth organs fitted the other, the recurved and open jaws resting on the concave pitfall. Woe be to any creeping thing that falls into this pit! In a moment the open jaws are closed over the

wandering insect, which is instantly lowered into the regions below, its body sucked dry, taken up to the top, and jerked clear out of the way.

So far I had been able to watch *above* ground, but I wanted to see what was going on below,—*how* the larva supported its body in its vertical burrow. To enable observation to be carried on, I obtained a number of glass jars, which I filled with sand. Then *close* to the side I made a hole a quarter of an inch diameter, ramming the sand somewhat hard. I withdrew the small rod, and carefully cleaned the inside of the glass, whose side formed part of the burrow. I next turned out a larva from the home colony, and transferred it to the glass jar, coaxing its tail first down the hole, which, when it had entered, it descended to the bottom, examining the sides, evidently not liking the transparent side. I watched it for some time, when it deliberately took a mouthful of sand, moistened it, and then plastered it over the glass. This act it repeated until it had plastered the sand up an inch and a half high, or a quarter of an inch beyond its own length. It then crawled up and took a look at me, as much as to say, "Now you cannot see what I am doing behind the screen,"—which was quite true. So I turned all out, starting a fresh hole, into which I once more put the larva, and once more it covered itself in—was turned out and in *many* times, until at last it became resigned to living in a hole exposed to the light on one side. After my repeated failures I could now see how it used its legs and tail to climb up its burrow; also, that after fitting its head in at the top it drew its abdomen up, bent it at the third and fourth segment, until the swollen fifth was brought right up and almost touching the thoracic plates. Then I observed the use of the two vertical spines on the apex of the hump; these were driven into the sand at right angles. The remaining four abdominal segments curled round until the anus reached the opposite side, into which the spines were driven; the larva now resting in a perfect zigzag form, which at the slightest movement of any object above would in a moment straighten the body and drop instantaneously to the bottom, and there remain until danger had passed, when it would re-ascend sitting in this zigzag position, waiting for hours and often all night (as I have proved by watching with it), until some insect came within reach. I had not been able to discover the use of the other pair of diagonal spines on the fifth segment; but I found out the larva could open them laterally until they stood almost at right angles to the body, so bringing the curved points into such a position that they would easily penetrate the sand.

Having noticed the ease with which the larva could throw its head backward, I caught a fly and held it between the pliers, and gradually bringing it near to the larva as it sat at rest. When within half an inch of the hole it was suddenly seized and snapped from the pliers, disappearing down the hole, but so rapidly taken that I could not detect more than an instantaneous movement and the disappearance of the fly. After repeated experiments I found that as soon as the

fly was placed within about half an inch, the larva evidently measured the distance and sprang up and backwards, seizing the fly from above, describing in its spring from its pole just the quarter of a circle. I next arranged the approach of the fly so that I could watch the movements of the larva from the *side* of the glass jar. Bringing my magnifier into focus *quietly*, I saw that the larva was "close-hauled" in its zigzag position. I then moved the fly, which the larva saw approaching,—at least, so I gathered from a slight alteration of position as I moved the fly, which was seized the moment it came within the striking distance. I held the fly, quietly pulling the thread which I had attached to it. The larva would not release its hold, and I was puzzled to know what held it in its hole, for the whole thorax and first two abdominal segments were arched over on the surface. After repeated failures I found that it was securely held in by the two long curved spines on the fifth abdominal segment. These were raised (as previously described), and driven deep into the side of the burrow, forming perfect anchors, and defying the prey to overcome the larva. The anal spines were also driven into the opposite side, so as to give additional power of resistance.

Believing that these larvæ catch their prey on the wing, I watched day after day until at last I had the pleasure of seeing a larva spring up and catch a blow-fly as it flew across the hole. Since then I have frequently seen them make unsuccessful attempts. Once I had fed each larva with an earwig, which all appreciated, and most, after shooting the whole skin away, sat at the top of their burrow enjoying the bright sunshine. I found a *large* earwig, which I put into the box, guiding it toward a large larva having a nap. This earwig crossed toward the pitfall, and when halfway over was shot up into the air a height of over a foot, turning several somersaults in its descent, moving off with considerable alacrity.

During October, on the approach of cold weather, the larva descend, excavate the hole, which is filled in from the inside, the larva remaining in a semi-dormant state through the winter, or until March is nearly over. It then opens up the burrow, and lives on the fat of insects. I once saw a large cabbage butterfly pinned to the ground by one of these larvæ; and in spite of its wings it could not free itself from the jaws of the anchored tiger. Another winter of abstemiousness is passed, and once more the sunshine is enjoyed until the end of July, when the now full-grown larva thinks a change necessary, so descending to the bottom of its burrow, which is frequently ten to fifteen inches deep, it excavates a large oval chamber, which is generally horizontal, though I have found them in a slanting position. This sepulchre is an inch and a half long by three-quarters in diameter. The sand excavated is carried up and rammed into the vertical hole. The larva then rests upon its back, the head being towards the vertical hole. The larva is supported and protected by the thoracic plate, and the protuberance and spine on the fifth abdominal segment, the anal segment



being bent slightly upward, so that no part touches the sand. In this position the larva rests for some ten or twelve days, when the skin splits at the back of the thorax, and is quietly cast, exposing to view the most delicately white pupa. The spines on the fifth abdominal segment disappear, and their place is taken by two finger-like processes, each surmounted by a brush of stiff hairs. These prominences project from the sides at an angle of about sixty degrees, and from each side of the first, second, third, and fourth segments there springs a similar but smaller process. These five pairs support the delicate pupa in the most wonderful manner, and prevent it from coming into contact with the sand.

A week after, the various organs begin to assume definite shape, and a delicate colour spreads over each leg and elytron, the eyes and jaws become differentiated. These colours advance in intensity, until in a little less than a month the pupa begins to kick its legs upward until they touch the roof of the sepulchre, it then manages to turn over on to its legs, the skin splits and is cast off, revealing a phantom tiger beetle, which looks like a limpid opal. In three or four days it is strong enough to hold itself up, and soon the colour and strength mature. Having placed several pupæ in an artificial sepulchre, I was enabled to watch all changes, until the beetle on reaching maturity objected to my inquisitiveness by plastering the glass over with wet sand. Most of the beetles arrived at maturity at the end of August, and *all remained in their sepulchres*, the following winter, until the approach of March and April, when they commenced to climb up the vertical burrow, which they enlarged by biting the *hard* sand away from the crown. This was always a laborious task, but no insect ever gives in from hard work, and in the course of a month or six weeks the mature beetle reaches the surface of the heath to find itself in gorgeous apparel, and with the power of flight, which it was not slow to use, soon finding a mate after its kind, obeying the command "to be fruitful and multiply."

Such is the life-history of *Cicindela campestris*, our common British Tiger Beetle.

### Further Notes on *Triphæna comes*, Hb. (Orbona, Fab.).

*Read by R. ADKIN, F.E.S., on April 23rd.*

In my notes on the genus *Triphæna*, Och. ("Proc.," 1890-91, p. 150), I briefly touched upon some of the more interesting points in connection with *T. comes*; but the scope available for dealing with even such matters as geographical distribution and variation, in so aberrant a species as the one under consideration, was inadequate without unduly extending the paper, and the remarks that I then

had to make were, of necessity, to a great extent of a comparative nature. Moreover the time that has elapsed has allowed of some further investigation of the subject, the result of which, I think, may prove of assistance in its consideration.

Dealing first with the question of geographical distribution, it will be desirable to fix the boundaries of the insect's range with some amount of exactness; this, however, is at all times a matter of some little difficulty. If a species is taken in a particular place, we have, in the fact of the capture, direct evidence of the occurrence of the species in that district; but the fact that it has not been observed is no evidence that it does not occur; therefore in attempting to define its range we must be guided, to a large extent, by what I may term presumptive evidence, by which I mean the probability of one set of known facts harmonising with other sets of equally well-understood circumstances, or the reverse. Fortunately the habits of *T. comes* are sufficiently well known, and we have records of its presence from places sufficiently near together to form a fair working basis.

Throughout Central and Southern Europe we have abundant evidence of its presence, the most easterly records being Amasia in Asia Minor, a few miles south of the Black Sea coast; Eibes, at the foot of the Taurus Mountains, in the same country, and just north of the Mediterranean; and Beyrout, on the Syrian coast. Possibly its range may extend some short distance further eastward; but having regard to the proximity in that direction of the vast tracts of desert lands and mountain ranges, coupled with the fact that we do not find the species represented in collections from Central Asia, we must conclude that we have reached the borders of its eastern range. The available information as to its southern limit is hardly so satisfactory. That it occurs along the northern shores of the Mediterranean and extends into some of the Greek islands there is no doubt; it is also credibly reported from the North African coast; but it is probable that it does not extend far south from the Mediterranean, for here again the vast sandy desert that stretches almost from the Atlantic seaboard to the Red Sea would no doubt check its progress in this direction. It was also included in the older Canary lists; but this last record appears to be open to grave doubt. The Lepidoptera of the Canary Islands have of late received considerable attention, and some few collections made there have from time to time been sent to this country; but, so far as I can learn, there were no *T. comes* in them. The species appears to have been included in the older lists on the authority of Brullé; but in the more recent literature on the Lepidoptera of the Canary Islands it is assumed that he was led into error by a small *T. pronuba*, a species that appears to be represented in greater or less numbers in every collection made in the islands. The Atlantic Ocean forms its natural western boundary. As to the northern limit of its range we have some precise and

interesting data, and it is very remarkable how close the various records correspond. Thus in Russia it is met with in the Moscow district to  $59^{\circ}$  north latitude. It occurs in Denmark and in Sweden, at Oster Gothland, also  $59^{\circ}$  N. latitude, but there is no record of it in Norway; while in our own country, as we all know, it extends to the Orkneys, which are intersected by the  $59^{\circ}$  N. latitude; but although the Shetlands have been systematically worked for some years past, no trace of it has been found there. The limits of its range, therefore, appear to be from  $30^{\circ}$  to  $59^{\circ}$  north latitude and from  $37^{\circ}$  east to  $11^{\circ}$  west longitude, or, in order words, from Algeria in the south to the south of Sweden in the north, and from Syria in the east to Ireland in the west—a somewhat restricted area, embracing a comparatively small portion of the northern temperate region, and it will be seen that the British Islands form its north-west limit.

Coming now to the second part of the question—variation,—it may be convenient to consider it under two heads, namely, general and local. It is an interesting fact that many species are far more prone to variation in the British Islands, or limited portions of them, than in other parts of the area which they inhabit. *T. comes* is no exception in this respect; not that it does not show forms varying from the type in other places, as we are reminded by the fact that names have been given to sundry forms by Continental authors, under the impression that they have been applying such names to distinct species; but nowhere do we find variation so frequent, so local, or assuming such extreme forms as in Britain. There is, however, throughout the whole geographical range of the species a tendency to modification of both colour and markings, increasing in intensity with its north-westward range, especially with regard to colour.

Of the series that I have had the opportunity of examining, the most uniform are from the Asia Minor district. The individuals of which they are composed are clay-coloured, or perhaps it would be more correct to say grey with an underlying reddish tone, and show but little difference in intensity of colour; the variations in markings are also trivial. In Central Europe some examples show a more decided reddish-grey tone, and the markings are not infrequently in somewhat stronger contrast to the ground colour, the effect occasionally being heightened by a pale outlining of the stigmata. In Denmark a "brick-red" form is said to occur, but I can find no mention of any special form from the adjacent Swedish locality.

Throughout England and Wales, as we all know, there is a large amount of colour variation, and the ornamentation is very diverse in pattern; but it appears to be universal, no particular locality, so far as at present ascertained, producing any special form not found elsewhere, except the Scilly Islands prove an exception. Here a form having unusually dark, sometimes almost black, scalloped transverse lines occurs. It is not the only form that occurs in these

islands, but it appears to be more intensely marked in the particular points indicated than any examples that I have seen from elsewhere.

In Ireland, more particularly in the north, there is, I think, a tendency to a brighter red colour in some individuals than is usual among the English, but it does not appear to indicate any constant form.

In Scotland endless varieties occur, including probably all those of general distribution; but in addition to these there is one form, namely, var. *curtisii*, Newm., which does not appear to occur elsewhere, in which the fore-wings are of a rich claret colour, more or less suffused with black, sometimes entirely so, and the usual markings are subject to sundry modifications. It is to this form that I wish more particularly to call your attention.

On 27th July, 1825, Curtis captured a moth that flew out of the heather on the Isle of Bute, and described and figured it in his "British Entomology," vol. viii, fasc. 340, under the name of *Triphæna consequa*, Hb. In 1871 Newman, after describing under the name of *Triphæna curtisii* a number of larvæ received from Forres, N.B. ('Entom,' v, p. 224), refers to Curtis's figure, and says, "as it certainly is not the *Noctua consequa* of Hubner," he proposes to call it after Curtis. He then goes on to say that Norman, of Forres, had taken the perfect insect somewhat abundantly, that there were then in the possession of himself and others a great number of pupæ which would on emergence "infallibly reveal their ancestry," if, as had been asserted by some entomologists, the supposed species should turn out to be but a form of *T. comes*. These pupæ on emergence did reveal their ancestry, and from that time there has been no doubt as to *T. curtisii* of Newman being a variety, though a well-defined one, of *T. comes*.

Probably the original specimen taken by Curtis was one of the most southerly captures of this particular variety, and even in Bute and Arran it is rare in comparison with the other generally distributed forms. Going northward, we find in Inverness, Aberdeenshire, and Elgin (in which Forres is situated), *curtisii* in increasing numbers; and in Sutherland, one of the extreme northern counties of the Scottish mainland, it also occurs, still mixed with the more ordinary forms. Digressing for a moment to the westward, a general mixture of forms occurs in the Isle of Lewis, Outer Hebrides, but the representatives of the *curtisii* form show a general inclination to a peculiar grey mottling of the dark claret-red, and a strongly marked outlining of the stigmata, a combination which appears to be very rarely met with elsewhere. Going northward again to Orkney we reach the limit of the range of the species, and here we find it represented *only* by an extremely dark form of the *curtisii* variety.

Curtis, when he described under the name of *T. consequa* his Bute insect, which we now recognise as the original specimen of var. *curtisii*, took considerable pains to differentiate between it and the other "British species" of *Triphæna*; he says, "That my specimen is dis-



tinct from our other species there is no doubt, for the superior wings are formed more like those of *Cerigo texta* (= *Cerigo matura*, Hufn., = *cytherea*, Fb.), the stigmata are larger than those of *T. orbona* (= *comes*), the fascia of the inferior wings is broader, and the superior margin *beneath* is black, not rosy."

From these remarks it is evident that he compared it with our ordinary South English forms, and no wonder the differences noted were sufficiently convincing; but how much more remarkable is the difference between the South-east European forms and the extreme forms from Orkney? Not only is there a vast difference in ornamentation, but the European examples are considerably larger and proportionately much more robust in structure than the

Desquamated wings of *Triphæna comes*.



Asia Minor.

Orkney.

Orkney representatives. The desquamated wings now exhibited show this very clearly; and although there does not appear to be any actual difference in the venation itself, it is noticeably slighter in structure in the Orkney insect, more particularly in the forewings.

In approaching the question of the probable line followed in arriving at this remarkable form of variation, it may assist us if we consider the matter under two heads, namely, retrogressive variation and progressive variation. The running together of certain spots on the under sides of the *Lycænidae*, the appearance of unusual markings in the members of some other groups, and similar phenomena generally accepted as cases of atavism,\* do not appear to me to offer an explanation in this instance. Such cases are generally of infrequent occurrence, and in parallel forms of variation among members of several nearly allied species, and are not necessarily confined to any particular district; but we do not find a similar form of variation to that observed in *comes* running through other members of the genus *Triphæna*, or of those of the large genus *Agrotis*, in which *comes* is now placed by many authors, nor have I been able to discover any

\* The Scilly examples already referred to may probably represent a case of atavism; the flouncing of the transverse lines is not infrequent in many of genera of the *Noctuæ*.

satisfactory evidence that would lead me to suppose that this special form of variation is in any sense a case of retrogression.

On the other hand, the prevailing conditions of a given district may be such as to render the existence of a species in its ordinary form precarious; such conditions might induce slight modifications in colour, or markings, or habits, that would be beneficial to the species, and the individuals acquiring them would possess an advantage as compared with those not having them. The circumstances that would in the first place induce such modifications would, if continued, probably tend to increase them in succeeding generations, until the point was reached at which the species had assumed the form in which it could take the fullest advantage of such conditions. Such a case would be progressive.

The form of *T. comes* most frequent throughout the whole range of its distribution is that which I have referred to as the clay-coloured form. This I take to be the normal form, and it is only as we reach the northern or western verge of the range of the species that we find any great amount of deviation from it. This, I think, points to the southern part of Europe as being the true home of the species. I am strengthened in this view by experiments that I have carried out by feeding up the larvæ in confinement. Under the natural conditions of our climate the larva, on leaving the egg at the end of August or early in September, feeds for about a month, and then goes into partial hybernation, not reaching full growth until the following June; but by keeping the larva at a somewhat higher temperature as the autumn advances, probably analogous to that which it would experience in the south of Europe when it was at a corresponding stage of its growth, it shows no disposition to hibernate, but feeds up readily,\* suggesting the probability of a succession of broods as the normal habit of the species, and that the partial hybernation is an acquired habit that enables it to keep its footing under altered climatic conditions.

If this surmise be a correct one, it may perhaps, to some extent, account for the darker forms assumed by the species in its more northerly habitats. Weismann, Merrifield, and others have shown us that modifications of colour may be artificially produced in some species by subjecting them to abnormal conditions in their earlier stages, one of the most remarkable results obtained being the darkening of the colour of the imago by the prolonging of the pupal stage by subjecting the pupa to a low temperature. Possibly some such conditions may be accountable for the increase of the redder tone noticed in the colour of the species in its more northerly dis-

\* Ova from Scotch (Forres) parents:

		1st Larva					
		1st Ova		went to		First	Last
		Hatched.		earth.	Last.	Imago.	Imago.
About 40	...	Sept. 9	...	Oct. 19	...	Nov. 23	Dec. 12
About 300	...	Aug. 24	...	Sept. 24	Oct. 12	Nov. 2	Dec. 19

tribution, and from these redder forms *curtisii* may have sprung. Indeed, the prevailing tone of colour of the forms found in the various districts embraced in the area covered by the species appears to lend some support to such a theory. Thus the specimens from Asia Minor (the south-easterly extremity of its range) are all of the greyish clay-coloured form; in Central Europe a distinct reddish shade is noticeable in many examples; reaching Southern Britain we find this intensified; in the north of Ireland, Denmark, and parts of Scotland many individuals are of a uniform brick-red colour; and further north, in Elgin, Sutherland, &c., a fair percentage of the claret-coloured *curtisii* variety are found; while in Orkney (the north-west limit of its range) the species is represented only by an extremely dark form of this variety. If we were shown a series of these Orkney examples beside one of the Asia Minor type, without any of the intermediates to connect them, we might well believe that they were distinct species, and in this remarkable divergence of form we probably have a good example of long-continued progressive variation.

## Is Cold the Cause of Melanism in Scotch Specimens of *Triphæna orbona*, Hufn. (*comes*, Tr.)?

By J. W. TUTT, F.E.S. *Read May 14th, 1896.*

AT the last meeting of the Society it will be remembered that I took exception to the following statement in Mr. Adkin's paper:—"I consider that all the evidence points to cold being the chief factor in the darkening of the species *Triphæna orbona* (*comes*) in its northern localities."

It may further be remembered that when I suggested that this theory (viz. that cold was probably the cause of the melanism in *T. orbona*) could not be sustained, because Moray was one of the mildest districts in Scotland, I was met with the statement that there "was *something* peculiar in the atmosphere of those parts of Scotland that produced these dark forms, for the fallows were some six weeks later than in England." This is the sort of statement that one cannot meet very well offhand, and I did not attempt to do so. As, however, the actual conclusions of Mr. Adkin's paper hinge entirely on this point, I think you will agree with me that the truth of the matter is worth seeking; for statements and deductions based on false data not only cease to be science, but mislead others who are anxious to do good work.

I therefore determined to look into the matter; and turning over the pages of the "Intelligencer" for 1858, I, by chance, came across the following on page 3, which suited my purpose admirably. It is from

Dr. F. Buchanan White, written to Mr. Stainton (Lewisham) from Perth, on March 23rd, 1858. It runs as follows:—"THE SALLOWs OUT IN SCOTLAND.—I am surprised that the sallows are not out with you; they have been out almost a week here. We have a long season of them here, for some grow on a sheltered side of Kinnoull and come out early, while the more exposed ones come out later. The *Tenio-campæ* do not appear to be out, as we only got *Orrhodia vaccinii* and *O. spadicea* at these sallows last night. At sugar we got *Scopelosoma satellitia*, *Orrhodia vaccinii*, *O. spadicea*, and *Calocampa exoleta*. We saw some Geometræ flying, and some Tortrices and Tineina sitting on whins and broom. We have had weather almost as warm as June for the last week." This evidently proves that the sallows are actually out in the neighbourhood of Perth earlier than in the south of England.

Thinking that it might be urged that this was only an exceptional case, I turned up some other records, made by Mr. Norman and Dr. F. B. White, which I had observed recently. These explorations gave the following result:—In the "Ent. Mo. Mag.," v., p. 203 (1868), Mr. G. Norman, who lived at Cluny Hill, Forres [and who was the first to breed the dark aberrations of *T. orbona* (*vide* "E. M. M.," viii., p. 273)], records as follows:—"March 28th, *T. piniperda* very abundant at sallows. March 26th, *T. gothica* common at sallows. March 27th, *T. instabilis*, frequent at sallows. March 28th, *T. stabilis* swarming at sallows." This, I take it, settles the fact that at Forres, the head-quarters of melanic *T. orbona*, the sallows are out at about the average time that the blossoms appear in most parts of England.

In "E. M. M.," vi., p. 190, Dr. Buchanan White writes:—"Rannoch and Forres can scarcely be compared; the former is a high-lying, cold, inland district, the other low-lying, warm (Forres is one of the mildest and driest places in Scotland), and maritime; and it is to this maritime situation that, I think, Forres is indebted for its southern species."

Mr. J. Jenner Weir, writing of the occurrence of the melanic form of *T. orbona* in the Orkney Islands, says:—"The Orkney Islands lie between 58° 41' and 59° 23' N. lat., and between 2° and 3° W. long., thus being from 7° to 8° north of London; still the *climate is mild*."

One more comparison to complete the evidence. This year, in "Ent. Record," vol. viii (May 1st and May 15th), are the following reports:—Hereford *April 4th*, MONTROSE *March 21st*, Morpeth *March 23rd*, *April 15th*, PERTH during *March*. In the late (1891) year we find ("Ent. Rec.," ii, 85—87):—Tewkesbury *May*, Warrington *May 7th*, Wickham Wood *April 20th—28th*, PITCAPLE last week of *April* and first week of *May*. These are, I doubt not, sufficient to convince you that "sallows" are in blossom in the warmer parts of Scotland at about the same time each year as in various parts of England.



The confusion has probably arisen through Mr Adkin confounding the hilly and mountainous districts of Perthshire, where the dark forms of *T. orbona* do not occur, with the low-lying Moray district. In Rannoch the sallows are, it is true, occasionally a few days (not six weeks) later than in the low-lying districts, and the greater altitude is quite sufficient to account for the difference; but even then Mr. Norman ("E. M. M.," vi, p. 167) records of his captures at Crieff in Perthshire, where "the climate is far colder and moister than in Morayshire," in 1869, as follows:—" *T. gothita*, March 31st, common at sallows. *T. stabilis*, March 31st, common at sallows. *Scopelosoma satellitia*, March 6th, common at sugar and sallows, &c." Even at Crieff, then, the sallows were out on March 6th, 1869. Comparing the two places—Rannoch and Moray—Mr. W. Salvage writes:—"Sallows are usually out in Moray at end of March; here at Rannoch in April." But it is a fact, as I have already pointed out, that in these later districts the dark forms of *T. orbona* do not occur, whilst in the warm Moray and Sutherland districts, where sallows blossom regularly at the time they do so in the south of England, they do occur. What, therefore, has cold to do with the melanism of *T. orbona*?

I think I have quoted sufficient authorities to show that a low mean temperature does not exist in the haunts of melanic *T. orbona*, and that the melanism of this species has an entirely different motive power behind it than that of those butterflies which Mr. Merrifield has shown to be affected in the direction of melanism by low temperatures. In fact, the two phenomena, although producing a similar result, viz. melanism, are brought about by entirely different processes, and evidently represent results of entirely different physiological values.

I cannot help adding that Mr. Adkin's erroneous notion about the low temperature of Scotland (a very common error, by the way) would soon be dissipated were he to run over the ground and see the hedges in some parts made of fuchsias, as in the warmer parts of Devonshire or in the Channel Islands.

I need not add that I shall be greatly interested to hear what Mr. Adkin now considers to be the motive power in the production of melanism in *T. orbona*. Will he not grant that certain "variational units" (Weismann) of the germ are by the process of intra-selection developed at the expense of the others, and that the actual pattern is moulded by utility. The only influence that meteorological conditions appear to exert in the more or less active participation in the development of the more assertive variational units? It appears to me that in this, as in many other parallel circumstances in Scandinavia, Scotland, and Ireland, the excessive humidity is more likely to be the prevalent meteorological factor acting on the organisms in these districts.

## What is the cause of Melanism in the Scotch Specimens of *Triphæna Comes*, Hb. (*Orbona*, Fb.) ?

By R. ADKIN, F.E.S. *Read December 10th, 1896.*

In the early part of the present year I read some notes on *Triphæna comes*. At the following meeting Mr. Tutt read a paper entitled "Is Cold the cause of Melanism in Scotch Specimens of *Triphæna orbona*, Hufn. (*comes*, Tr.)?" the opening sentence of which reads thus:—"At the last meeting of the Society it will be remembered that I took exception to the following statement in Mr. Adkin's paper: 'I consider that all the evidence points to cold being the chief factor in the darkening of the species (*Triphæna orbona* [*comes*]) in its northern localities.'"

I may say at once that, on referring to my paper, I could not find any such statement as that adverted to by Mr. Tutt; nor do I think that any portion of the paper, or the paper as a whole, is capable of this construction; but lest anything in it conveyed such an impression to the meeting, I gladly accept the opportunity thus offered to revert to the subject.

My object in writing the paper was to record the forms of this interesting species occurring in the various districts of its known geographical range, rather than to assign any particular cause for the assumption by it of any special form, and I think Mr. Tutt must have based his idea of the conclusions at which I arrived, on a desultory conversation which followed the reading of the paper; the chief topic of which was, I believe, the question of the comparative times of the blooming of the "sallows" in various parts of Scotland and England, a point which is likely to be very incorrectly stated when given from memory alone, as was the case on that occasion.

A large portion of Mr. Tutt's paper is taken up with quotations from various magazines to show that the blooming time of the "sallows" is about the same in the "warm Moray and Sutherland districts," where the melanic forms of *comes* occur, as in the south of England, and that Orkney also has a mild climate; and he concludes with the remark that he will be greatly interested to hear what I now consider the "motive power" in the production of melanism in *T. orbona* (*comes*), and suggests that "the excessive humidity is more likely to be the prevalent meteorological factor" in these districts.

If Mr. Tutt had said *quite as likely* instead of *more likely*, we should, I think, have been entirely in accord, but it may be well to briefly review the question.

In the first place it must be remembered that we are not dealing with a boreal or an alpine species. On the contrary, all the obtainable information points clearly to its being one that inhabits districts

of comparatively low elevation and mild climates, constant in pattern and colour in the south-eastern portions of its range, of which Asia Minor may be considered the boundary, and becoming variable in the north-western, of which the British Islands form the limit, and assuming the specially dark forms which we know as var. *curtisii* only in some of the more northerly portions of the latter.

In such places as they do occur, these dark forms appear to be fairly generally distributed, and not confined to any particular patch of land, except perhaps in Orkney. Thus Mr. W. Salvage, who has probably had as large an experience with them as any English collector, tells me that in the Forres district they are to be found on the low-lying sand-hills, in Altyre Woods about two miles from Forres, and in Darnaway Forest on the other side of the river Findhorn, both places situated just above sea-level; the larvæ feeding on broom, blackthorn, whitethorn, grasses, bramble, birch, and even furze and juniper,—in fact, on anything they can find on which to pick up a living; also on the Califer, a hill about three miles outside Forres up to an elevation of from 500 to 1000 feet, where the larvæ feed on furze, broom, and grass, there being little else for them to eat, and that the usual proportion of dark forms throughout the whole district, which is embraced in a radius of about six miles, is about 20 per cent., and that much the same state of affairs exists in the Sutherland and Inverness localities, but that the proportion of dark forms is not quite so large. Mr. McArthur gives some further details with regard to the Forres locality. He says, "Mr. Salvage, who has collected so often in the district, is no doubt quite correct in saying that the larvæ are to be found all round the neighbourhood; but from my own experience I can only give you two localities, namely, a sandy stretch of land on the river Findhorn, some 50 feet above sea-level, and a moor some three miles from Forres, the elevation of which is, I should think, about 400 to 500 feet above the sea, and there the larvæ were common. I had as nearly as possible the same number of larvæ from each locality, and kept them separate, and I distinctly remember that those from the moor produced more *curtisii* than those from the Findhorn. In Hoy (Orkney) *comes* is rare, and the few larvæ I took came from a very bare, wet peat-moor some 60 feet above the sea, and, as you know, they produced *only* dark forms."

Mr. W. Reid, of Pitcaple, whose experience of the species in its Scottish haunts extends over some twenty years, gives some interesting details, which he has collated from his note-books. He agrees with Mr. Salvage that throughout the Forres district the percentage of *curtisii* is as nearly as possible the same on both the sand-hills and the highest lands; he finds no difference between its habits and those of the typical forms, it being fond of concealment, such as is to be found in thatch, haycocks, peat-stacks, &c., never resting on the ground except it has been disturbed, and then only for a few moments, until it has recovered itself. He finds that the headquarters of the dark (*curtisii*) forms are the Moray (Forres) and

Nairn districts, in which latter he considers them rather darker than elsewhere, and he has found them throughout the whole of the central and northern counties of Scotland, "always excepting the higher mountains," in varying proportions to the type, of which the following table gives his estimate :

Moray (Elgin),	<i>Curtisii</i> about 20 per cent.			
Nairn	"	"	20	"
Aberdeen	"	"	15	"
Kincardine	"	"	10	"
Banff	"	"	10	"
Inverness (N. and W.)	"	"	10	"
*Forfar	"	"	2	"
Perth	"	"	1	"

Inverness (South), Ross, and Sutherland not sufficiently worked to give reliable percentages, but we know that Mr. Salvage took a considerable number of *curtisii* in the last-named county.

At Rannoch, an exposed district in Perthshire, some 800 to 1000 feet above sea-level, the species is scarce, and the only record of *curtisii* that I have been able to obtain is a single example taken by Mr. Reid ; but he agrees with Messrs. Salvage and McArthur that here, as in the case of the other more exposed inland localities, the prevailing dark form is of an almost unicolorous deep brick-red, a considerable proportion of the examples found being of this form.

With regard to local meteorological influence, it is conceded that both in Forres, in the parts of Sutherland, and the Hebrides, where the species occurs, and in Orkney, the climate is mild. Comparison, however, of the last-named place, where the species is represented only by an extremely dark form of the *curtisii* variety, with the Scilly Islands, where the *curtisii* variety does not occur, may be interesting, as the two areas have so much in common meteorologically. Both are insular, both have equable and humid climates ; but the chief point of difference between them is that the mean *annual* temperature of Orkney, 45° F., is exactly the same as the mean *winter* temperature of Scilly. If, then, humidity were the one and only "motive power" in producing the dark forms, and temperature had nothing to do with the question, why should we not find *curtisii* in Scilly as well as in Orkney ? On the other hand, if the lower temperature alone were responsible for the dark forms of *T. comes* in Orkney, why should not the few scattered examples of the species found on the bleak Rannoch moors be also of the dark form ?

Whatever the "motive power" in producing these dark forms may be, it must be sought for beyond the simple questions of humidity and temperature. Is not the first great principle in nature the possibility of existence ? If, then, the prevailing conditions in a given

\* Probably this estimate would prove too low if the district were more worked.



locality are such as to render the existence of a species precarious in its ordinary form and habits, but by certain possible modifications its footing may be rendered more secure, will not these same local conditions form the "motive power"? Humidity, temperature, soil, and a multitude of other local surroundings are no doubt factors in the case, but does not the whole volume of evidence that has been adduced of late years on the melanic question suggest that it is a complex system, rather than any one meteorological or other simple power that acts on the variational susceptibilities of the organism and produces these local variations?

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## Notes on the Lepidoptera observed during the Society's Field Meeting at Chalfont Road on July 18th, 1896.

Compiled by R. ADKIN, F.E.S. Read July 23rd, 1896.

THE third field meeting of the season was held on Saturday, July 18th, the district selected being the Woodlands stretching along the banks of the river Chess, beyond Chenies in Buckinghamshire. The party, under the guidance of the president, Mr. South, left Baker Street station, Metropolitan Railway, by the 2.37 train, arriving at Chalfont Road about an hour later. From the station, a start was made along a by-road on the left running parallel with the railway. Along this road a quantity of *Silene inflata* grows, and a nice form of *Dianthæcia carpophaga* has been bred from larvæ infesting it, but a diligent search failed to detect any of the desired larvæ on this occasion, although there were strong evidences of their work upon some of the seed capsules, and possibly some of the members, who collected quantities of the capsules at random, may be rewarded by ultimately finding among them larvæ that their eyes were unable to detect at the time of gathering. Here, too, *Pieris rapæ*, *P. napi*, and *P. brassicæ*, which last, by-the-bye, appears to have been a scarce insect during the past two or three summers, were found in some numbers, and were also met with still more commonly in the woods later on. *Vanessa urticæ* was well out, and sunning itself on the scabious and thistle flowers; while *Cænonympha pamphilus*, *Polyommatus phlæas*, *Epinephele ianira*, and *Hesperia sylvanus* were flying in the sunshine, and a few *Strenia clathrata* and *Crambus pratellus* were dislodged from the herbage.

On reaching the end of this road, a turn to the right along a narrow lane brought us to the woods, their near presence being

indicated by several *Epinephela hyperanthos*, all in a more or less wasted condition, flitting along the hedges. These woods are so unlike what we are accustomed to in the counties south of the Thames that a brief description of them may be interesting in passing. Their primary object is evidently the production of fine timber, more particularly beech, which is the predominating tree, interspersed with oak, wych elm, and cherry, but these latter are in small numbers as compared with the beech; and here and there a solitary larch or fir. As a rule the trees are bare of branches to a considerable height, often twenty or thirty feet from the ground, and as they are planted at some distance apart, the woods have a very light and open appearance. The undergrowth consists chiefly of bramble, dog's-mercury, and such like, and it is only here and there that anything like tall underwood occurs. In these woods *Asthena blomeri* has been taken in some numbers, while *Abraxas sylvata* occurs in abundance in its season, but neither species was met with on this occasion.

The sun was beginning to droop in the heavens when we entered the woods, casting its rays obliquely under the branches of the tall trees, and directly on to the patches of bramble growing beneath them—a sight to gladden the heart of the butterfly hunter, for if there were any butterflies in the wood they would surely come to such sunny spots for their evening meal. Nor were our most sanguine expectations to be disappointed. Most of the species already noted were again met with, sipping the honey from the few remaining bramble blossoms, and then fluttering away high up into the thick branches of the trees to seek shelter for the night. Now a grand female *Argynnis paphia*, the only one seen, floated over the thorny bushes, but having the mark of some enterprising bird on her wings, she was allowed to pass on her way to continue the work of perpetuating her species. But what is that dark-looking little butterfly flitting over the bramble patch? A solitary *Thecla w-album* was taken on the wing just before we entered the wood, can it be another? Now it has settled, and there is no mistake about it being that species, and there is another, and another,—why, there is no end of them, every bramble patch has some of them on it. And look at this wretched spider's web, there are dozens of their wings in it, as well as those of another species that we have not previously seen, *Pararge egeria*, but of course we are too late for the first brood. The “hairstreak,” too, we find on closer acquaintance has been on the wing for some time, but occasionally a freshly emerged specimen comes along, and looking after them finds plenty of employment for all of us until the shadows begin to fall; and the place of the butterflies is taken by myriads of *Botys ruralis* (*verticalis*, Schiff) and *Hypana proboscidalis*, with a few *Scopula prunalis*.

And we, too, are beginning to think of an evening meal. A start is consequently made in quest of a cottage in the wood, where legend says that “teas are provided,” but half an hour's search

proving futile, the pangs of hunger growing apace the while, we make a start for Chenies. The greater part of the way is through the woods, and an opportunity was thus afforded of searching the tree-trunks, with the result that some few species were added to the day's take, among them being *Eugonia quercinaria*, several of which were also found hanging from the dry grass stems by the wayside; *Macaria liturata*, *Larentia viridaria*, *Coremia unidentaria*, *Cidaria silacea*, and, of course, *Camptogramma bilineata*, but the last was more frequent among the undergrowth than on the tree stems. A dead specimen of *Drepana cultraria* was picked up by the wayside, and sundry *Triphæna pronuba*, *Leucania pallens*, *L. conigera*, *Apamea didyma*, and the like darted out from the herbage as we passed along.

Ultimately we reached the "Duke of Bedford" inn at Chenies, where the much-desired "tea" was soon set before us, and it is needless to add was done ample justice to by the whole party, after which a start was made for the return journey through the woods.

By this time it was nearly dark, and there was no lack of insects on the wing, but unfortunately time did not permit of any very close inspection being made of them; one could not, however, fail to notice the phantom-like flight of *Hypena proboscidalis*, now even more plentiful than in the earlier part of the evening. At the corner, where we emerged from the woods into the open, a mass of clematis that was in full bloom was literally alive with moths, of which a hasty selection was made, but, so far as I am aware, revealed no fresh species of any special interest. A short walk across the fields brought us back to the railway station, after a most enjoyable afternoon, and all feeling much indebted to our guide for an introduction to a beautiful, though little worked, and probably productive country.

**My Summer Holiday, and what I noted with regard to *Acidalia marginepunctata*, Göze, and the earlier stages of the second brood of *Cyaniris (Lycæna) argiolus*, L.**

*Read by R. ADKIN, F.E.S., on November 12th.*

The story of "My Summer Holiday" has been so oft repeated, that it might well be inferred that little information remained to be gathered from an additional visit to the "sunny" town of Eastbourne, where the majority of my holidays have been spent during the past ten years, and it was with feelings akin to this that I took up my temporary abode there in the middle of August last. From an

entomological point of view the neighbourhood cannot be said to be improving; bricks and mortar still grow apace, to the extinction of much land formerly productive to the collector; and with the increase of houses there is naturally a very considerable augmentation of the population, whose busy feet keep up a constant tramp over the still unencumbered lands in the proximity of the town.

Of course, there are still many miles of downs and woodlands within easy reach that have as yet hardly been worked; but circumstances did not admit of my exploring them, and my attentions were necessarily confined to the town and its immediate neighbourhood. It was not long after my arrival, however, that two species came under my notice, which provided employment for my leisure time during my stay; it was fortunate, too, that both occurred within the precincts of the town, so that, despite the unsettled and boisterous weather that frequently prevailed, I was able to keep a continual watch upon them, and thus study their habits in a way that would have been impossible had their habitat been at a greater distance.

#### NOTES ON *ACIDALIA MARGINEPUNCTATA*.

The first of the two to attract my attention was *Acidalia marginepunctata* (*promutata*, Gn.). My acquaintance with the species in this locality was first made so long ago as August, 1887, and during the nine years which have since elapsed I have carefully observed it whenever opportunity has offered. The extension of the parades from the "Wish Tower" to the border of the pit near Holywell was completed a little prior to this time, previous to which the sea-front was composed of a sloping chalk cliff, largely covered by a luxuriant growth of wild carrot, and no doubt the species was an inhabitant of these slopes. The making of the parades, though possibly thinning its numbers for a time, did not exterminate it, and the heavy growth of tamarisk (*Tamarix gallica*) which now extends from end to end of them affords equally good cover as the wild carrot formerly did. Some of the numberless species of small plants growing among it provide a suitable pabulum for its larva; and thus it is enabled not only to hold its own, but actually to obtain an increased footing, although occasionally harassed by the strenuous efforts of the town gardeners to keep these tamarisk-covered banks in "apple-pie order." A good illustration is thus afforded of the pertinacity with which a species will cling to its original haunts under altered conditions, and perhaps also of the possibility of such conditions, although largely artificial, being advantageous to it.

But the point that has most interested me throughout has been the peculiar form assumed by a large proportion of the examples here met with. The description given of the imago in our handbooks is briefly, "grey, with a faint ochreous tinge," or "pale-whitish ochreous, much dusted with black," and with



sundry transverse lines ; all apparently agreeing as to the "much dusted with black" character. Such a description well covers the forms usually met with, and applies equally well to a portion of the Eastbourne individuals ; but in a much larger proportion of them the "black dusting" is so nearly absent as to give the insect the appearance of having a clear bone-coloured ground, with sundry transverse grey lines, what few black scales there are being confined to the basal portion of the wing within the first line, and are often visible only when viewed through a fairly powerful lens. I at first thought the absence of dusting might be the result of age, but I have taken this form fresh from the pupa, with wings still hanging limp, and yet with hardly a black speck on them. For some years the only specimens met with that showed any variation that did not come well within the two extremes above mentioned, *i.e.* the usual grey-looking dusted, and the bone-coloured plain forms, were two taken in 1889, which, although the outer three-fourths of their wings are almost devoid of any "dusting," have the black scales so thickly placed on a portion of the basal fourth as to give them the appearance of having blackish basal patches. But during the present summer I had the good fortune to find three examples so densely covered with the black dusting as to give the appearance of a black insect with pale submarginal line, analogous to the so-called black forms of several of the species of the genera *Boarmia* and *Tephrosia*.

No doubt the natural resting-place of the insect was originally the chalk cliff, but under its present artificial conditions it rests with outstretched wings on the rough walls that keep up the earth-banks along the parades. These walls are constructed of a sort of sand-stone peculiar to this part of the coast ; it is somewhat variable in tint, but comes within the various shades of grey, and the ordinary forms of the insect harmonise with it so well that sometimes when boxing a specimen, if the species is fairly abundant, one sees one, two, or even three or four others resting close by that had escaped previous notice. Not so, however, with these "black" forms, which appeared as conspicuous objects even at some little distance. One is consequently somewhat at a loss to understand what useful purpose in the insect's economy is served by the assumption of this dark form.

The species, judging by the literature of the subject, appears to have been generally regarded as single-brooded, its time of appearance being variously stated as June and July by some authors, and July and August by others. This arises, I think, from a confusion of two broods. Some years ago, when at Shanklin, Isle of Wight, I found the species very commonly on the street lamps in the first week of July, but all that were then taken were much worn, evidently the late stragglers of a June brood. Unfortunately my visits to Eastbourne have been confined to the months of August and September, but they have extended over a sufficiently long period of those months to enable me to note the earliest emergences

at that time of the year, and to follow the brood through. Thus in 1891 I arrived on the scene on August 1st, but it was not until the 13th that any *A. marginipunctata* appeared, one being taken on that day, four on the following, and so on in increasing numbers to the 23rd, when the species was exceedingly common; but from that day gradually diminished in numbers, until only a few wasted examples remained when I left on the 30th. This year I did not reach Eastbourne until August 15th, and on that day found a couple of the moths. The species gradually became more and more common until the 24th, on which day 102 specimens were counted; on the 25th fifty-seven; on the 26th twenty, and by the end of the month only two or three washed-out stragglers could be found. My attempts to rear the larvæ resulting from this brood, which, had they proved successful, would no doubt have set the matter at rest, have thus far been only partially so; but, as will be seen from the following, they point very clearly to a June emergence. Ova deposited on August 19th, 1891, hatched September 5th, and the young larvæ fed slowly on knot-grass (*Polygonum*) until October 17th, when they were moved to a lot of mixed herbage growing in a flower-pot. During the winter they occasionally nibbled their food when the weather was mild, but by May 23rd, 1892, only eight survivors could be found. By June 13th these had spun cocoons for pupation, but unfortunately all died without changing.

In considering these dates it must be borne in mind that these larvæ throughout their existence would have much less warmth than they would have had in their natural habitat, where whatever sunshine there is falls directly upon the banks where they feed; and this would doubtless enable them to feed up quicker after hibernation, and would so curtail that period as to allow of the moth being on the wing by the middle of June, thus giving ample time, just in the hottest part of the summer, for another brood to feed up and produce imagines by the dates on which I have found them; and there can be, I think, no doubt that, on the south coast at any rate, the species is regularly double-brooded.

#### NOTES ON THE EARLIER STAGES OF THE SECOND BROOD OF *CYANIRIS (LYCÆNA) ARGIOLUS*.

On the afternoon of August 17th, one of the few sunny days that fell to my lot during my stay at Eastbourne, I was wending my way along the sea-front, towards the downs near Beachy Head, when a blue butterfly, flitting leisurely over the tamarisk-covered banks, attracted my attention. Blue butterflies, of one sort and another, may be seen there frequently enough, but something in the colour and flight of this particular one suggested to my mind that it was not one of the species ordinarily met with. Consequently I kept it in sight, not having my net fitted up at the time, in the hope that it

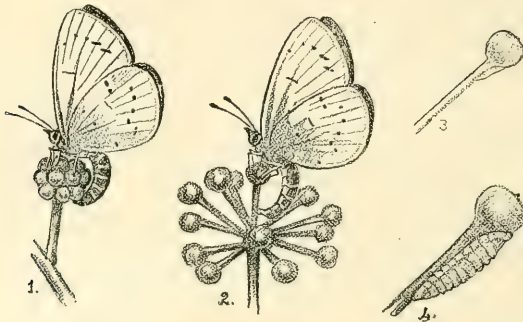
might settle, and allow of closer inspection. For this I had not long to wait, for on approaching some ivy growing on a wall that supports the bank it soon selected a head of flower-buds, and settled upon it, and allowed me to approach sufficiently closely to examine it without any attempt at resuming flight. I soon perceived that it was a female *Cyaniris argiolus* in the act of depositing ova; and so intent was she upon her work that I was able to box her, ivy-buds and all, without difficulty. On reaching home I sleeved her on a good bunch of the same plant with a little moistened sugar to feed upon, but she survived only four days, during which time she deposited four ova.

The 19th was one of those brilliant mornings that seldom occur except on the approach of bad weather; not a breath of air stirred, and the sun shone with a scorching heat, surely a morning to induce any butterfly to bestir itself in its life-business. I therefore set out in the hope of being able to verify my former observations. The ivy patch where the *argiolus* was taken on the 17th was deserted; but taking a little-frequented road somewhat higher up the cliff, I soon found several plants of ivy in full bud, growing on a low wall, and on one of them two *argiolus* were busily engaged in ovipositing. One flew away on my approach; but fortunately the other paid no heed to my presence, and allowed me to watch the whole of the interesting operation repeated several times; until having apparently completed her task she followed the example of her companion, flitted away over a garden, and was soon lost to sight. An examination of the ivy buds revealed some few recently deposited ova, and a larger number of empty egg-shells. A portion of the former I took home and placed with those I already had, and I was thus able to observe two separate colonies, the one under absolutely natural conditions, the other in confinement.

I need hardly say that my visits to the wild colony were frequent and often protracted; for watching the growth of the larvæ, and comparing their behaviour with that of those I had in confinement, was exceedingly interesting, and on leaving Eastbourne I had no difficulty in collecting a couple of dozen of them, bringing home with me just thirty larvæ, including those I had reared in captivity; and I was thus able to complete my observations of the species from the laying of the egg to the assumption of the pupal stage, of which the following is a short history. The ova and larva have already been described in considerable detail (*vide* Buckler's "Larvæ of the British Butterflies and Moths," vol. i, pp. 94—100). I therefore propose to confine my remarks on the species chiefly to its habits.

At the time when the butterflies of the second brood are on the wing the flower-buds of the ivy are still small, and generally form compact green heads, in shape closely resembling an unripe blackberry. The butterfly, having selected one of these heads, settles upon its top, closes her wings over her back, and bending her abdomen down and round underneath the buds affixes an egg to the

under side of one of the slender single-bud stalks, at a point about one third of its length from the crown of the main stalk whence the bud stalks spring. But occasionally a more advanced head is selected, the buds of which have separated from each other, and the total circumference of which is consequently increased, so that the butterfly resting on the top of the head of buds cannot reach the stalks of the lowest row with her abdomen; but the position on the stalk, rather than the particular stalk, appears to be the object she has in view, for she then thrusts her abdomen in between the buds, and thus attains the desired position on the stalk for depositing the egg. Generally one egg only is laid on a head of buds, but occasionally two or even three or four are so deposited.



1. 2. *C. argiolus* depositing ova on young, and on more advanced, heads of flower-buds of ivy.  
3. 4. *C. argiolus* larvæ resting on flower-buds of ivy.

In about a week the eggs hatch; the young larva in coming forth breaks away a considerable portion of the crown, but leaves the remainder of the shell intact and firmly attached to the bud-stalk.

What then became of the minute larva, and how it fed, I for some time had great difficulty in determining, and had it not been for an accident I should probably have arrived at the erroneous conclusion that in its earlier stages it entered the buds for both food and shelter. There was no great difficulty in finding a minute hole in one side of the bud; but as the larva that had evidently made it did not appear to be visible anywhere in its neighbourhood, the natural conclusion was that it had gone inside. I therefore determined to open one of the affected buds, and on doing so found only slight signs of feeding having taken place on the soft inside of the bud near to where the hole entered, but no larva was there. On releasing the bud, however, I found what appeared to be the mangled remains of a larva adhering to it. Further heads of buds with egg-shells attached were therefore examined with still greater care, each separate bud and its stalk being scrutinised under a lens, with the result that I beheld one of the most remarkable cases of protection afforded to a larva



by its surroundings that has yet come under my notice. The colour of the newly-hatched larva is a pale bright green, but it is covered with a number of whitish hairs which give it a soft greyish-green tone that exactly matches the colour of the ivy bud, and the position that it selects when resting is the junction of the bud-stalk with the bud; the two or three anterior segments resting on the under side of the bud are pressed closely against it, the remainder of the body lying stretched along the stalk, so that when the bud is viewed from the top the larva is so far hidden as to be virtually invisible; and when held up sidewise the resemblance to a slight thickening of the stalk, at its junction with the bud, is so complete that one would not suspect the presence of a larva without first being assured that one was there. Throughout its life the larva is very sluggish, seldom leaving the head of buds on which it is hatched, so long as sufficient food remains for its nourishment, or occasionally when about to moult. In many cases I found nearly full-fed larvæ on the same head of buds on which they had evidently been hatched; but in some few cases where the empty egg-shell and traces of feeding showed that the buds had been tenanted, but the larva was absent, it was usually to be found on the back of one of the nearest ivy leaves, and, I think, in each case in the act of moulting.

From what I have already said it will be gathered that the food of the larva consists of the soft portions of the inside of the ivy flower-bud; and although those I had in captivity were throughout supplied with young leaves as well, they were in no case eaten, nor were any of the expanded blossoms, which I also gave them, touched. The larva appears to feed only at night, and its manner of feeding, which is the same throughout its life, is as follows. A bud having been selected for a meal, a round hole is eaten through the outer shell sufficiently large for the head to pass freely through, but not large enough for the anterior segments to enter; they consequently press closely upon the outside of the bud, while the head is stretched forward through the hole, and free to move from side to side inside the bud. In the case of a large larva the whole of the soft inside of the bud is devoured, but the younger larvæ appear to be able to reach only the portion of the inside nearest to the hole. It is somewhat remarkable that the fact of the buds having been thus eaten does not prevent them ultimately expanding; but, of course, when they do so they are *minus* stamens, completely or partially as the case may be. In from four to six weeks from the time of hatching the larva is full-grown. It then quits the buds, and having selected an adjacent leaf, attaches itself to it by slender silken threads, and in a few days becomes a pupa, in which state it of course passes the winter.

But by no means all of the larvæ that attach themselves for pupation reach that stage. Of the thirty that I brought home with me, more than half, instead of becoming pupæ within three or four days after affixing themselves to the leaves, remained for nearly a fortnight

without changing, and at the end of that time a single yellowish-white dipterous larva, but little smaller than its host, came forth from each, and where possible made for the side of the cage, and having crawled some three or four inches along it, leaving as it did so a slimy trail similar to that left by a slug, either attached itself to the side of the cage or fell to the earth, and within a few minutes had assumed its pupal shape, but remained of the whitish larval colour for some hours, eventually turning to a deep brown.

Considerable discussion has from time to time taken place as to the food of *C. argiolus*. The regular stock list given in our butterfly books is flowers of holly (*Ilex*), ivy (*Hedera*), and buckthorn (*Rhamnus*); to which Wilson, in his "Larvæ of the British Lepidoptera," adds blackberry (*Rubus*), flowers and seeds; in Buckler's "Larvæ of the British Butterflies and Moths," *Escalonia* and *Cornus sanguinea* (dogwood) are also given, while *Euonymus europæus* (spindle-tree) is mentioned by Harwood. The question has also been discussed on more than one occasion in these rooms, Mr. Oldham ("Proc." 1886, p. 53) some little time since showing us a sprig of holly with ova attached, and in July of last year Mr. Dennis assured us that a brood that he had just reared fed indiscriminately on holly leaves and flowers, and on ivy leaves.

But it may be interesting to see how some of the above-mentioned food-plants have come to be recorded. Holly and ivy are both established upon endless observation for the first and second broods respectively, the only question regarding them being whether the leaves as well as the flower-buds form a natural food for the species. Such recorded evidence as I have been able to collect on this particular point is as follows. Mr. T. P. Lucas watched a female depositing ova on the flower-buds of holly in a garden near the Vauxhall Bridge Road at the end of April, 1874 ("Entom.," vol. vii, p. 292). Mr. Buckler had a few eggs laid by a captured female on the footstalks of flowers of holly, in the spring of 1862; the larvæ fed first on the flower-buds, and afterwards on the young green berries. In August he received ova from Mr. Bisshopp, laid just beneath the flower-heads of an umbel of ivy. And in September he found three larvæ on heads of ivy flower-buds, resting on the flower-stalks. The same authority also tells us that of two June larvæ beaten from holly, one pupated without feeding, but that he watched the other eat a large piece out of a holly leaf. Also that eggs were laid on holly and young shoots of ivy by a female in captivity in May, that the larvæ resulting were fed on holly (but whether leaves or flower-buds is not mentioned) and on ivy (evidently from the time of year on the leaves), and that those on the latter progressed more rapidly than those on the holly ("E.M.M.," vol. xiii, p. 29). Then we have Mr. Dennis's evidence that his spring larvæ fed indiscriminately on holly leaves and flowers and ivy leaves. Unfortunately in each case where the leaves were eaten we are left in doubt as to whether the larvæ were also supplied with flower-buds; this, I think, is

an important point, for the opened flower does not admit of the larva feeding in the same manner as does the unexpanded bud. The bare fact of eggs being found on a sprig of holly cannot be regarded as direct evidence that the larvæ would feed on the leaf by preference. I have had eggs of *Himera pennaria*, which certainly cannot be regarded as a holly feeder, deposited in an exactly similar position, although the parent moth, being at large, had her choice of all the trees in the forest to lay them on.

As to the other food-plants mentioned, Westwood and some of the French authors appear to be responsible for the introduction of buckthorn to the list ("Entom.," vol. xix, p. 156), and from its time and manner of budding it is not an improbable substitute for the holly buds and young berries as a food for the early brood, and the same may be said of the *Euonymus* mentioned by Harwood ("Entom.," vol. xix, p. 88), and possibly also of the *Cornus* mentioned by Fletcher (Buckler's "Larvæ," vol. i, p. 188), but in neither case are details given, and all no doubt apply to the spring brood; as does the *Escalonia*, regarding which the information we have is that on June 22nd, G. F. Mathew had a flower of that plant brought to him to look at, and on it detected a larva of *argiolus* ("Ent. Mo. Mag.," vol. xiii, p. 62). As a substitute for ivy for the second brood the only suggestion is blackberry, and beyond the mention of it by Wilson I can find little to support it. Harcourt, Bath, certainly mentions that bramble might be a suitable food because it remains in blossom from July to October ("Entom.," vol. xix, p. 61). In addition to which we have the following interesting note, which, I think, to be duly appreciated, should be given in full:—" *Lycæna argiolus*. I am pleased to be able to record a new food-plant for this species. Mrs. Boley, a lady much interested in rearing Lepidoptera, induced a female of *Lycæna argiolus* to deposit its eggs by enclosing it under a glass shade with some ivy blossoms and other flowers. It took no notice of the ivy, but laid its eggs on blackberry (*Rubus*) blossom. The young larvæ are now feeding on the *bollen* (the italics are mine) of these flowers.—W. A. Luff, Guernsey, September 18th, 1876 " ("Entom.," vol. ix, p. 257).

Then in conclusion we have the exceedingly methodical performance of the broods under observation this autumn. Firstly, the imagines (three at least, and judging from the number of egg-shells found from time to time, many others) deposited their ova in the same special manner; the larvæ, both those in captivity and a much larger number at large, probably the offspring of several parents, rested in the same peculiar way on the ivy buds and bud-stalks, in a manner that is clearly for their benefit. All took their food in precisely the same manner; indeed, so persistent were they in their method of attacking the buds, that on one occasion when those in captivity were nearly full-fed, and the supply of well-developed buds ran short, they attacked the young buds that were still in compact heads, first eating holes in the exposed outer ring of buds, and then

forcing themselves in between it and the next ring, proceeded with it in a like manner, rather than go from their usual method and attack the exposed tops of the buds, which they could have done far more easily, or eat the young leaves, of which there were plenty in the cage. No doubt under forced conditions the larva would take other foods; but habits so strongly ingrained as those already recited point conclusively to the flower-buds of the ivy being the natural pabulum of the autumn larvæ; and in the spring the flower-buds, and later the young green berries of the holly, would offer precisely similar opportunities to the early brood for practising the same peculiar habits.

### Notes upon *Agrotis auxiliaris*, Grote.

By W. MANSBRIDGE, F.E.S. *Read December 10th, 1896.*

I FIND that I shall have to call the subject of these notes not *A. subgothica*, but *A. auxiliaris*, for although the entomologist of the U.S. Department of Agriculture so named a specimen of the buff form, I discovered when I visited the national collection in the British Museum that my species was to be referred to *auxiliaris*. It is with great regret that I make this admission, because there may be some members present who have come especially to obtain a few facts concerning *A. subgothica*. I can only apologise, and cite the London fogs as aiding and abetting, because they have prevented me examining collections on the only Saturday afternoons that were available to me for study. I had hoped to find *A. subgothica* in the North American collection of Doubleday, but was disappointed, and it was only last week that I found opportunity to consult the types in the Natural History Museum, when the knowledge of the error came too late to announce any alteration. However, the present species, although, so far as I am aware, having no especial interest or associations with British entomology, presents points of character which are well worthy of our notice, since the variation runs on almost parallel lines to that of *A. tritici* and *A. aquilina*.

All my specimens are from a North American district in the Cherokee nation of the Indian territory, and were taken by myself under the following circumstances. The granaries belonging to the ranch where I was staying were mere wooden sheds, built of dressed lumber, and supported about six inches from the ground upon stones at the corners. The ground beneath them had never been ploughed or broken, but was bare of herbage for some yards around. To make good joints where the boards had bulged from the weight of grain strips of quilting had been nailed, and it was behind these strips that I found the moths in the daytime. The granary was



divided into three sections, containing wheat, oats, and maize on the cob, respectively, and I found them in each, but chiefly in the oat and wheat cribs. There were no quiltings in the maize bin, which probably allowed for the difference in numbers. I made thorough search, but could not find any pupa cases; and although the moths were in all cases beautifully fresh, I was forced to conclude that they had flown there, and hidden for shelter and safety in the daytime. A few specimens came to light between 8.30 and 10 p.m., but I never found them in the daytime about the house or stables or away from the granary, although there were plenty of similar retreats for them. It is curious that they should affect one building used for a particular purpose, almost to the exclusion of the others near by. The indications appeared to be strong that there was some connection between the moth and the corn.

With all my care I was not able to find any direct evidence; but in August of the same year, when the ears of unripe maize were gathered for culinary purposes, I found that many of them contained larvæ about three parts grown, which one immediately recognised as being on the same general lines as most of the *Agrotidæ*, and I thought it highly probable that it was the earlier stage of my moth from the granary. These larvæ would have been full-fed about the middle or end of August, and as the corn crop (maize) is harvested during the first week of September, or earlier, it is reasonable to assume that some would be carried with the ears of corn to the granary, where it would be stored until required for use. Unfortunately I left the Indian Territory before this interesting point could be cleared up; and when I returned the next spring I was too late for the species, again leaving before the Indian corn was in ear.

The series of *A. auxiliaris* brought forward to-night was taken from April 28th, 1893, until May 14th of the same year, one specimen being the least on a particular day, and twenty-one on two occasions the largest number. In 1894 I saw a worn specimen at St. Louis about the middle of April. The species seems to have a great dislike for daylight, and as I lifted the sheltering rags they often scuttled off, and dived into crevices whence I could not extract them.

The variation runs in two distinct parallel series, viz. a grey form and a buff or stone coloured form. The individuals range from bright, strongly-marked specimens to dull, almost unicolorous examples in both lines; and then mottled forms, which have lost the characteristic costal and dorsal bands of the majority, while the sub-marginal, though nowhere absent, is very much fainter. These curious mottled varieties seem to obtain their peculiarity from the appearance, or reappearance, of black costal dots and markings, which are obscured in the strong specimens at the head of the first two rows by the bright costal streak; further down the series the other bands are broken into as well, until the general appearance of the insect is completely altered. A very important mark soon becomes

fainter and then obsolete, and, curiously enough, it is buff-coloured in all the specimens that possess it. This is the median oblique line which, commencing at the orbicular, ends a little way above the outer angle of the fore-wings. This line is so prominent that were it not for the intermediates, in which one can trace its gradual suppression, it might be thought that it was sufficient to mark the limits of a species. It will be noticed that the grey specimens more quickly tend to become unicolorous; and in these toned examples, so to speak, it is the grey and not the black that predominates. I have only one good example of a melanic form; in regard to this one it is scarcely beside the mark to repeat a former statement made at this Society—that the atmosphere in the Indian Territory is exceptionally moist, the average barometric reading for many consecutive weeks being 28·8, with no great extremes even when violent atmospheric changes occurred.

## LIST OF MEMBERS

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Chief subjects of Study :—*h*, Hymenoptera ; *o*, Orthoptera ; *he*, Hemiptera ; *n*, Neuroptera ; *c*, Coleoptera ; *d*, Diptera ; *l*, Lepidoptera ; *ool*, Oology ; *orn*, Ornithology ; *r*, Reptilia ; *m*, Mollusca ; *cr*, Crustacea ; *b*, Botany ; *mi*, Microscopy ; *e*, signifies Exotic forms.

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### YEAR OF ELECTION.

- 1886 ADKIN, B. W., Brandon House, Morden Hill, Lewisham, S.E.  
*l, orn.*
- 1882 ADKIN, R., F.E.S., *President*, Wellfield, 4, Lingard's Road,  
Lewisham, S.E. *l.*
- 1891 ANDERSON, R. J., Suez.
- 1895 ASHBY, SIDNEY R., 8, Canterbury Terrace, Maida Vale, N.W. *l.*
- 1895 ASHDOWN, W. J., Belmont Road, Leatherhead. *l.*
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Nor-  
folk. *l.*
- 1888 AULD, H. A., 209, Stanstead Road, Forest Hill, S.E. *l.*
- 1887 BARCLAY, F. H., F.G.S., F.E.S., Knotts Green, Leyton, Essex-  
*l; orn, palæontology.*
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1896 BARNETT, THOS. L., Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., 39, Linden Grove, Nunhead, S.E.  
*l, m.*
- 1896 BARTLETT, A. H., M.A., 34, Vanbrugh Park, Blackheath, S.E.
- 1889 BEAUMONT, A., F.E.S., The Red Cottage, Pond Road, Black-  
heath, S.E. *l, c, orn.*
- 1888 BENNETT, W. H., 15, Wellington Place, Hastings. *h, c.*
- 1893 BILLINGHURST, H., 35, Granville Park, Lewisham, S.E. *l, c.*
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road,  
Peckham, S.E. *h, o, c, d, he.*
- 1897 BISHOP, E., Lulworth Grove Lane, Kingston-on-Thames. *l.*
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*
- 1896 BOWEN, F. A., 11, Buckland Crescent, Hampstead, N.W. *l.*
- 1895 BOWMAN, K., 18, Victoria Road, Clapham Common, S.W. *l.*

YEAR OF  
ELECTION.

- 1887 BRIGGS, C. A., F.E.S., Rock House, Lynmouth, N. Devon.  
*l, m, n, o, British fishes.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, N. Devon. *l.*
- 1891 BRIGGS, H. MEAD, c/o Mrs. Pagdain, St. Mary's Road, Ealing, W. *l, orn.*
- 1890 BRIGHT, P., F.E.S., Roccabrunna, Bournemouth. *l.*
- 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l.*
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l.*
- 1895 BROOKS, W., Grange Hall, Rotherham. *l.*
- 1890 BROWN, E. W., Capt., 2nd Royal West Kent Regiment, Dublin, Ireland. *l.*
- 1890 BRYANT, G., F.E.S., 2, Elmfield Road, Balham, S.W. *l.*
- 1890 BUTLER, W. E., Hayling House, Oxford Road, Reading. *l, c.*
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l.*
- 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l.*
- 1886 CARPENTER, J. H., "Shirley," St. James's Road, Sutton, Surrey. *l.*
- 1877 CARRINGTON, J. T., 1, Northumberland Avenue, W.C. *l, cr.*
- 1872 CHAMPION, G. C., F.Z.S., F.E.S., Heatherside, Horsell, Woking, Surrey. *c.*
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood, S.E. (*Hon. member*). *h, l, c.*
- 1895 CHIPPS, F. W., 1, Castlenau Terrace, Barnes, S.W.
- 1888 CHITTENDEN, D., Willesboro' Lees, Ashford, Kent. *l.*
- 1896 CLARK, F., Paddington Infirmary, W. *mi.*
- 1887 CLARK, J. A., F.E.S., The Broadway, London Fields, E. *l.*
- 1888 CLARKE, A. L., 24, Estelle Road, Gospel Oak, N.W. *l, b.*
- 1879 CLODE, W. (*Life member*).
- 1884 COOK, A. E., 31, Lower Road, Rotherhithe, S.E. *l, orn, r.*
- 1885 CROKER, A. J., 90, Albert Road, Walthamstow. *l.*
- 1891 DACIE, J. C., Mayfield, 105, Upper Richmond Road, Putney, S.W. *m, l.*
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l.*
- 1889 DENNIS, A. W., 48, Mansfield Street, Kingsland Road, N.E. *l.*
- 1890 DENNIS, G. C., F.E.S., 39, Blossom Street, York. *l.*



YEAR OF  
ELECTION.

- 1890 DOBRÉE-FOX, Rev. E. C., Castle Moreton Vicarage, Tewkesbury. *l*.
- 1884 DOBSON, H. T., F.E.S., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn.*
- 1886 DUNNING, J. W., M.A., F.L.S., F.Z.S., F.E.S., 4, Talbot Square, W. (*Hon. member*).
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, Kidbrook Lodge, Blackheath, S.E. *l, e l*.
- 1896 ELDRIDGE, A., Christ Church Schools, Alpha Road, Surbiton Hill. *l*.
- 1877 ELISHA, G., F.E.S., 122, Shepherdess Walk, City Road, N. *l*.
- 1886 ENOCK, F., F.L.S., F.E.S., 21, Manor Gardens, Upper Holloway, N. *d, mi*.
- 1889 FARRANT, M., St. Thomas, Exeter. *l*.
- 1894 FELL, FRANCIS, 21, Whitehall Road, Anerley, S.E. *l*.
- 1888 FENN, C., F.E.S., Eversden House, 83, Burnt Ash Hill, S.E. *l*.
- 1888 FENTON, F. E., F.R.C.S., M.R.C.P., F.I.Inst., Langstone, Ealing, W.
- 1872 FICKLIN, A., Norbiton, Surrey. *l*.
- 1891 FILER, F. E., 58, Southwark Bridge Road, S.E. *l*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Fairlawn House, Worthing, Sussex (*Life member*). *l*.
- 1889 FORD, A., 48, Rugby Road, Brighton. *l, c*.
- 1891 FORRESTER, A. C., 99, Endlesham Road, Balham, S.W. *l*.
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Mereworth, near Maidstone, Kent; and Western Dispensary, Westminster, S.W. *l*.
- 1886 FROHAWK, F. W., F.E.S., 39, Dornton Road, Balham, S.W. *l. orn, r, gen. zoo.*
- 1895 FURNEAUX, W., F.R.G.S., "Penlee," Ommaney Road, New Cross, S.E. *l, pond life, gen. zoo.*
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l*.
- 1885 GOLDTHWAITE, O. C., F.E.S., 3, Duke of Edinburgh Road, Carshalton, Surrey. *l*.
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Apsley Road, Clifton, Bristol. *l*.

YEAR OF  
ELECTION.

- 1895 GRIFFITHS, G. C., F.Z.S., F.E.S., 43, Caledonia Place, Clifton,  
Bristol. *l, el.*
- 1893 HALL, A., 16, Park Hill Rise, Croydon, Surrey. *l, el, ool.*
- 1888 HALL, A. E., F.E.S., Norbury, Sheffield. *l.*
- 1884 HALL, T. W., F.E.S., *Treasurer*, Stanhope, The Crescent,  
Croydon, Surrey; and 61, West Smithfield, E.C. *l.*
- 1891 HAMM, A. H., 24, Hatherley Road, Reading. *l.*
- 1892 HARRISON, A., F.C.S., Thames Sugar Refinery, Silvertown, F.
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill,  
S.E. *l.*
- 1886 HENDERSON, J., 24, Birchin Lane, E.C. *l; orn.*
- 1890 HILL, H. A., F.E.S., 9, Addison Mansions, Kensington. W. *l.*
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l.*
- 1889 HINCHLIFF, Miss K. M., Worlington House, Instow, N. Devon.  
*l, el.*
- 1888 HOPKINS, H. E., 153, Camden Grove North, Peckham,  
S.E. *l.*
- 1889 HORNE, A., 52, Irvine Place, Aberdeen. *l.*
- 1886 JÄGER, J., 180, Kensington Park Road, Notting Hill, W. *l.*
- 1887 JENNER, J. H. A., F.E.S., 4, East Street, Lewes, Sussex. *l, c,  
d, m, b.*
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Waltham-  
stow. *l.*
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie  
House, Monaghan, Ireland. *l, mi, marine invertebrata.*
- 1884 KENWARD, J., Rosslyn, New Eltham, Kent. *l.*
- 1888 KNIGHT, E., 1, Phoenix Villas, Devonshire Road, Merton, S.W.
- 1894 LAMB, H., Acacia Place, Upper Faut, Maidstone. *b, orn.*
- 1892 LARKIN, J. W., 48, Buckleigh Road, Streatham Common, S.W.
- 1889 LEGROS, A. V., 205, Bravington Road, Paddington, W.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l.*
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L.,  
F.R.S., F.L.S., F.G.S., F.E.S., etc., High Elms, Down,  
near Farnboro', Kent (*Hon. member*). *h, b.*
- 1896 LUCAS, W. J., B.A., 21, Knight's Park, Kingston-on-Thames.  
*l, o, n, m.*

YEAR OF  
ELECTION.

- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview,  
Clarendon Road, Lewisham, S.E. (*Hon. member*). *n*.
- 1892 MAIN, H., Thames Bank House, East Greenwich, S.E. *l*.
- 1886 MANGER, W. T., F.E.S., 100, Manor Road, New Cross, S.E.  
*l, c. cr.*
- 1889 MANSBRIDGE, W., F.E.S., 9, The Green, Stratford, E. *l*.
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l*.
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India.  
*mi, b.*
- 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W.
- 1896 MONINGTON, H. W., 8, Weswell Road, Streatham Common  
S.W. *b.*
- 1896 MONTGOMERY, ARTHUR M., 32, The Grove, Ealing, W. *l*.
- 1896 MONTGOMERY, EDMUND M., 32, The Grove, Ealing, W. *l*.
- 1880 MONTIERO, SENOR A. A. DE C., F.E.S., Rua de Alecreon,  
Lisbon.
- 1889 MOORE, H., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l,*  
*e h, e d, mi.*
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1889 NICHOLSON, W. E., F.E.S., Lewes, Sussex. *l*.
- 1886 NUSSEY, B. L., 167, Jarvis Street, Toronto, Ontario, Canada. *l*.
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South  
Woodford, Essex. *l*.
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1895 PARTRIDGE, Col. C. E., 20, Hornsey Rise Gardens, Crouch  
End. *l*.
- 1894 PEACH, A. W., 9, Holly Road, Chiswick. *l*.
- 1884 PEARCE, A. E., 12, Marius Road, Upper Tooting, S.W. *b.*
- 1888 PEARCE, J., 4, Borough High Street, London, S.E.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.  
*l, h, d.*
- 1888 PERKS, F. P., 41, St. Martin's Lane, Charing Cross, W.C.  
*zoology, mi, pond life.*

YEAR OF  
ELECTION.

- 1889 PERRY, Rev. J. F., Oxford Road, Banbury. *l, c.*
- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Huddersfield. *l.*
- 1896 POTTER, A. T., Whangarei, Auckland, New Zealand.
- 1888 REID, W., F.E.S., Pitcable, Aberdeen. *l, continental l.*
- 1887 RICE, D. J., 13, Great Ormond Street, W.C. *orn.*
- 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
- 1893 ROBINSON, F. J., Jun., 49, Charing Cross, W.C. *l.*
- 1894 ROBINSON, LEIGH, 54, Boundary Road, N.W. *l.*
- 1888 ROBSON, H., 5, Winterwell Road, Brixton Hill, S.W. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l.*
- 1887 RUSS, P., Culleenamore, Sligo, Ireland. *l.*
- 1895 RYE, B. G., F.E.S., 212, Upper Richmond Road, Putney, S.W. *l c.*
- 1891 SABEL, E., F.Z.S., F.E.S., F.R.G.S., Linton House, South Side, Clapham Common, S.W.
- 1886 SALWEY, R. E., F.E.S., Sun Gate, Hook Road, Kingston-on-Thames. *l.*
- 1888 SAUZÉ, H. A., *Hon. Librarian*, 4, Mount Villas, Sydenham Hill Road, S.E. *l.*
- 1888 SHORT, A., 14, Melody Road, East Hill, Wandsworth, S.W. *l.*
- 1890 SMITH, W., 6, Buchanan Terrace, Paisley. *l.*
- 1890 SMITH, WALTER, 2, Gloucester Villas, Strawberry Hill Road, Twickenham.
- 1882 SOUTH, R., F.E.S., *Vice-President*, 100, Ritherdon Road, Upper Tooting, S.W. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Thorpe Hall, Colchester (*Life member*). *l.*
- 1872 STEP, E., F.L.S., Portscatho, Cornwall, *b, m, orn.*
- 1872 STEVENS, S., F.L.S., F.E.S., Loanda, Beulah Hill, Norwood, S.E. *l.*
- 1889 STURT, W. T., West House, Queen's Road, Kingston Hill. *l.*
- 1894 TARBAT, Rev. J. E., The Common, Weybridge. *l.*
- 1895 THORNHILL, W. B., Castle Cosey, Castle Bellingham, near Drogheda, Ireland. *l.*



YEAR OF  
ELECTION.

- 1895 TOLHURST, J., "Glenbrook," Beckenham, Kent. *l.*
- 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l.*
- 1895 TUNALEY, HY., F.E.S., 30, Fairmount Road, Brixton Hill, S.W. *l.*
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 13, Drakefell Road, St. Catherine's Park, S.E. *l. orn.*
- 1886 TUTT, J. W., F.E.S., *Vice-President*, Rayleigh Villa, Westcombe Park, Blackheath, S.E. *l.*
- 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d.*
- 1889 VINE, A. C., 45, Temple Street, Brighton, Sussex. *l.*
- 1889 WAINWRIGHT, C. J., F.E.S., 147, Hall Road, Handsworth, near Birmingham. *l.*
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., 23, Ranelagh Road, Marine Town, Sheerness. *l. c.*
- 1890 WALLACE, G., 6, Borough High Street, S.E. *l.*
- 1888 WALLER, R., 2, Grand Parade, Upper Richmond Road, Putney, S.W. *l.*
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.Z.S., F.E.S., etc., Merton Hall, Thetford, Norfolk (*Hon. member*). *l. orn.*
- 1890 WARD, A., 66, Richmond Road, Brighton. *l.*
- 1888 WARNE, N. D., 8, Bedford Square, W. *l.*
- 1888 WARNE, W. F., 8, Bedford Square, W. *l.*
- 1887 WATERHOUSE, E. A., 23, Spencer Road, Putney, S.W.
- 1896 WATERS, A. H., B.A., 48, Devonshire Road, Cambridge. *l. m.*
- 1886 WATSON, C. H., 53, Glen Eldon Road; Streatham, S.W. *l.*
- 1888 WEBB, S., Folkestone Road, Dover. *l.*
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road, S.E. *l. c.*
- 1878 WEST, W., L.D.S., Cyprus Villa, Lewin Road, Streatham Common, S.W. *l. mi.*
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l.*
- 1891 WILLIAMS, H., 6, Langthorne Terrace, Ashburnham Road, Southend-on-Sea. *l.*
- 1888 WINKLEY, M. H., 9, Glen Eldon Road, Coventry Park, Streatham, S.W. *l.*

YEAR OF  
ELECTION.

- 1893 WOLFE, J. J., Skibbereen, Co. Cork, Ireland. Z.
- 1895 WOOD, H. L., The Old Grammar School House, Ashford,  
Kent. Z.
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House,  
Strand, W.C. Z.
- 1888 YOUNG, J. N., 85, FitzWilliam Road, Rotherham. Z.
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Members will greatly oblige by informing the Hon. Sec. of any errors,  
additions or alterations in the above Addresses and descriptions.

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